

BIOLOGICAL ABSTRACTS

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As an initial operation, a general questionnaire containing thirty items was designed to develop information of a basic nature. This questionnaire elicits information concerning education, experience, familiarity with foreign languages, scientific and professional affiliations, hobbies, and other data. The questionnaire is distributed to persons in all of the scientific and professional fields which are being surveyed.

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Editors: A. H. GRAVES, *Plant*; C. A. KOFOID, *Animal*

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1. LINDEMAN, EDUARD C. *Ecology. An instrument for the integration of science and philosophy.* *Ecol. Monogr.* 10(3): 367-372. 1940.

2. PARVULESCU, V. *Mémoire sur l'organisation générale de la matière vivante. [The organization of living matter.]* *Bull. Acad. Méd. Roumanie* 11(1): 53-71. 1941.

MICROSCOPY, TECHNIQUE

3. ALYEAE, H. N. *The electron microscope.* *Jour. Chem. Education* 18: 236-237. 1941.

4. BASSETT, DAVID L. (*Stanford U.*) *Preparing permanent deep chamber mounts of variable dimensions.* *Stain Technol.* 16(4): 165-168. 1941.—A rapid and simple method for the prepn. of permanent deep chamber mounts of variable size, shape and depth is descr. The chamber sides are made with aluminum wire bent on a form of the proper size and shape. Aluminum wire is nicely adapted for use due to its pliability and clean appearance. It undergoes no apparent change in contact with the mounting medium. Depth of the chambers is deter. from the gauge of the wire. Clarite, used as the mounting medium, is prepared as a thick soln. in toluol (70-75% of clarite by wt.). The resulting preps. are crystal clear, colorless, and according to the work of other investigators, do not become acid with age.—*Auth. abst.*

5. BECKER, JOSEPH A., and ARTHUR J. AHEARN. (*Bell Telephone Lab.*) *Electron microscopes and their uses.* *Sci. Month.* 53(4): 309-324. 22 fig. 1941.—The various types of electron microscopes and some of their uses are described.—*F. R. Hunter.*

6. DRAWERT, HORST. (*Bot. Anst. U. Jena.*) *Zur Frage der Stoffaufnahme durch die lebende pflanzliche Zelle.* *Flora* 34(2): 159-214. 5 fig. 1939.—The influence of pH of the staining soln. of 40 basic stains (a) on the migration in an electric field, (b) on the solubility in hydrophobic, neutral, as well as acid organic solvents, and (c) on the absorption by tannin-free and tannin-bearing plant cells was studied. The upper and lower epidermis of the scales of resting and growing bulbs of *Allium cepa*, as well as filaments of *Spirogyra* sp., and surface sections of the under side of the leaf of *Sempervivum holochrysum*, *Doronicum* and *Impatiens* sp. were used as materials for study. For most of the stains the insolubility in neutral organic solvents parallels the migration of the stain particles in an electric field. Only the electrically neutral molecule of the dye

base (with a few exceptions) is soluble in the organic liquids. Similarly also the living tannin- or fatty acid-poor cell absorbs only the molecule of the dye base. The addition of free oleic acid to the neutral organic solvents increases their solvent capacity since now in addition to the molecules of the dye base the molecules of the dye salt also are soluble. Corresponding to the behavior of the solvents containing oleic acid the living cell containing much fatty acid or tannin likewise absorbs the molecule of the dye salt. How far here an ion exchange also is concerned remains for the present undecided. The dye ions, if an eventual ion exchange is disregarded, are stored neither by the neutral and acid organic solvents nor by the living cells. Only the cellulose membranes of dead and living cells under certain conditions bind the cations by electro-adsorption. The dissociation relations of the stains as well as the accumulation capacity (solution affinity) of the organic phases determine the solubility of the stain in hydrophobic solvents. The same factors also play a decisive rôle in the absorption or non-absorption of the stain by the living cell. A study of the effect of inorganic salts (alkali, earth alkali and aluminum salts) on the solubility of 4 suitable basic stains in hydrophobic liquids and on absorption by the living cell showed that this effect depends first of all on an alteration of the dissociation relations of the stain. Thus the salts do not affect the absorption of basic stains by the living cell by means of a change in the permeability of the plasma boundary surfaces. The stain rhodamine S which is insoluble in hydrophobic organic liquids forms a precipitate with tannins. Accord-

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ingly it is not absorbed by cells free of tannin while tannin-bearing cells accumulate it in large amounts. Ammonia, grape sugar, KCl , $CaCl_2$, $AlCl_3$, at the concs. studies (10^{-3} to 1 mole) had no effect on the absorption of rhodamine S by tanniferous cells. Evidently the permeability of the plasma boundary surfaces appears only rarely as a limiting factor in the non-absorption of basic stains. The distribution coeffs. which depend upon the accumulative capacity of the external medium and of the cell contents as well as the dissociation ratio of the stain are much more decisive as concerns absorption or non-absorption. A sharper line of separation is drawn between the concepts "permeation" and "absorption" since with reference to the basic stains permeability is presupposed, but not solely decisive for absorption. Furthermore, a distinction is made between the

concepts "absorption" (=internal absorption=plasma+vacuole absorption), "membrane absorption" and "total absorption" (=internal+membrane absorption). If permeability relations of the plasma membrane enter as an inhibiting factor in the absorption of basic stains they do so first of all according to the principle of ultrafiltration. The objections raised by the adherents of the lipoid theory as against Ruhland's theory of ultrafiltration are based in part on the false assumption that permeability and absorbability are equivalent. The lipoid solubility may be of decisive significance for the absorbability of a stain but hardly to the same degree however for its permeation capacity. The different location of the point of reversal of membrane vacuole staining in the tissues of different spp. (depending on the CH of the external soln.) and with various stains can be explained directly by the distribution coefficients which depend upon the different accumulative capacities of cells and upon the dissociation ratio of the stain. The significance of the varying absorption capacities of cells for the migration of substances in cellulose membranes of the parenchyma are pointed out.—Auth. *summ.* (tr. by H. F. Bergman).

7. CORRINGTON, JULIAN D. (*Washington College*) *Working with the microscope.* xi+418p. Frontispiece, 121 fig. Whittlesey House: New York, 1941. Pr. \$3.50.—This is a concrete, concise, and unusually readable manual of microscopy and microtechnique. Designed for the use either of the amateur working alone or the student proceeding under supervision, the book begins with a discussion of the simplest mounts and progresses by easy stages through smear preparations, microfossils, and sections, to the electron microscope. The explanations are pleasantly presented and concise, and numerous illustrations serve further to clarify the text. There is a chapter on the preparation and use of reagents, a section of reference tables, a comprehensive bibliography, and an adequate index. The part played by the microscopist in the various fields of industry and public health is discussed.—*Marjorie Gerken.*

8. GAGE, SIMON HENRY. *The microscope.* 17th rev. ed. viii+617p. Illus. Comstock Publishing Co.: Ithaca, 1941. Pr. \$4.—The new material in this outstanding book concerns the electron microscope, new models of optical microscopes, high power mercury lamps, Polaroid in the polariscope, and directions for the utilization of new synthetic mounting media. There are numerous minor changes in text and illustrations to further clarify the presentation. The book remains an indispensable tool in microscopy.—*C. E. McClung.*

9. GROAT, RICHARD A. (*U. Wisconsin*) *Clearing tissue with mixtures of tributyl and tri-o-cresyl phosphates.* *Stain Technol.* 16(3): 111-117. 1941.—Mixtures of tributyl phosphate (Commercial Solvents Corp.) and tri-o-cresyl phosphate (Eastman Kodak Co.), of varying proportions, may be used as immersion fluids for clearing gross specimens. By varying the ratio of the former to that of the latter (measured volumetrically) from 1:130 to 22:110, mixtures having refractive indices varying from 1.555 to 1.534 can be made. A table of mixtures and the index of each is given in this paper. Preparation of specimens consists of skinning, eviscerating, fixing, washing, bleaching (when necessary), dehydrating, and defatting. The proper clearing mixture is determined by the immersion method, which entails microscopic observation of a 50-micron section of tissue to be cleared.—Auth. *abst.*

10. KERNS, K. R. (*U. Hawaii*) *Pasternack's paraffin method modified for plant tissue.* *Stain Technol.* 16(4): 155-156. 1941.—This method for preparing paraffin sections of plant material is a modification of Pasternack's one-hr. method for animal tissues. Fixation in Randolph's CRAF fixative is hastened by heat and increased vapor pressure obtained by the use of screw top vials. Dehydration with Zirkle's butyl alcohol series likewise is hastened in the same manner. The rapid penetration of paraffin by the use of $\frac{1}{2}$ paraffin and $\frac{1}{2}$ butyl alcohol in heated screw top vials shortens the embedding process. Sections are held on the slide through staining by albumen fixative and a coating 0.2% celloidin in absolute alcohol and ether. Good penetration with freedom from shrinkage or distortion is obtained and root-tip chromosome counts can be made in 3 hrs.—Auth. *abst.*

11. KERSTEN, H., and G. F. SMITH. (*U. Cincinnati*) *An apparatus for washing tissue.* *Stain Technol.* 16(4): 157-158. 1 fig. 1941.—Apparatus useful for washing large numbers of individual specimens in preparation for making histological sections is descr.—*C. G. Kadner.*

12. LILLIE, R. D. (*Nation. Inst. Health, Washington, D. C.*) *Romanowsky staining with buffered solutions. III. Extension of the method to Romanowsky stains in general.* *Stain Technol.* 16(1): 1-6. 1941.—Solns. at 0.3 g. per 100 cc. of equal parts of glycerin and methyl alcohol of various Wright, Giemsa, Leishman and Balch stains and similar eosinates of thiazene dyes give satisfactory wholesale staining of sections without differentiation when buffered with citric acid and Na phosphate. Prestaining with alum hematoxylin adds to depth, density and permanence of nuclear staining, but decreases clarity. A satisfactory modification of Mayer's acid hemalum is descr. The reaction should be pH 4.2 for neutral formalin or Orth fixation, pH 4.6 for acid formalin, pH 5 for Zenzer formalin and pH 6.5 for ethyl or methyl alcohol or Carnoy fixation. Toluidine blue phloxinate is a desirable stain; and its preparation is descr. Clarite and clarite X are superior to neutral Canada balsam, and somewhat inferior in regard to fading compared with liquid petroleum as mounting media for these Romanowsky stains.—Auth. *abst.*

13. RASMUSSEN, GRANT L. (*Med. Coll. State So. Carolina*) *A method for stamping serial numbers on celloidin sections.* *Stain Technol.* 15(3): 113-114. 1940.—Triune Opaque Stamp Ink (black) has been found satisfactory for stamping figures on the celloidin prior to cutting the sections. Rotating rubber number stamps and Opaque Stamp Pad, which reduces evaporation and consequent gumminess, are additional requirements for this method.—*C. G. Kadner.*

14. RODDY, WILLIAM T. (*U. Cincinnati*) *Frozen section micro-incineration.* *Stain Technol.* 16(3): 101-104. 1 fig. 1941.—A method for micro-incineration of frozen sections is descr. Material containing diffusible or soluble salts is cut on the freezing microtome and the sections are placed into xylol and mounted out of xylol onto Corex D slides previously filmed with glycerin-gelatin medium. Material containing non-diffusible or insoluble salts can be fixed in 10% formalin before sectioning. Sections of the fixed material are dehydrated through 50, 70, and 95% ethyl alcohol and mounted out of absolute alcohol onto Corex D slides previously filmed with glycerin-gelatin medium. After mounting by either procedure the sections are incinerated in an electric furnace and the temp. of incineration is dependent on the type of tissues to be incinerated and the character of the salts present. The method is time saving and when no fixation is required the whole procedure can be carried out in one hr.—Auth. *abst.*

15. ROE, M. A., A. WILCOX, and R. D. LILLIE. *Eosinates of the azures and methylene blue in preparation of a satisfactory Giemsa stain from dyes of American manufacture.* *Publ. Health Repts.* 56(39): 1906-1909. 1941.—A Giemsa type formula consisting of azure A eosinate, azure B eosinate, methylene blue eosinate, and methylene blue (88%) in proportions approx. 1, 5, 4, 1, respectively, shows advantages over similar formulae consisting of pure thiazin dyes in constancy of composition, and consequent ease of prep. The method for preparing the necessary eosinates is described. The formula recommended stains malaria parasites in both thin and thick blood-film preparations, and other blood parasites.—*M. A. Roe.*

16. SEMMENS, C. S., and P. N. BHADURI. (*Kings Coll., U. London*) *Staining the nucleolus.* *Stain Technol.* 16(3): 119-120. 1941.—A procedure for staining nucleoli or slides with sectional material is descr.—*C. G. Kadner.*

17. ZIRKLE, CONWAY. (*U. Pennsylvania*) *Combined fixing, staining and mounting media.* *Stain Technol.* 15(4): 139-153. 1940.—A number of non-volatile, water-soluble substances can be added to the usual acetocarmine fixing fluids. These inert substances do not alter the fixation image and serve as mounting media when the volatile ingredients of the mixture evaporate. Formulae are given for solns. containing dextrin, dextrose, gelatin, pectin, sorbitol, and sucrose. Gum arabic can be incorporated in a formic-acid-carmine fixative. The limiting factor in the use of such mounting media in fixing fluids is the osmotic

value they give the soln.; with certain precautions, however, they can be used in place of the usual aceto-carmine treatment. The indices of refraction of these media are not as high as those of the natural balsams and the fixation images which the mixtures produce have the characteristic limitations of those secured by the aceto-carmine technic. Some of the natural balsams (Canada balsam, sandarac and Venetian turpentine) can also be incorporated in fixing fluids. These fixatives are able to hold balsam and water in soln. together, and, as the volatile components of the mixtures evaporate, the fixed specimens remain in permanent balsam mounts. The addition of carmine to these fluids enables us to fix, stain, dehydrate, clear and mount a specimen in a single operation. These fixatives preserve more details of chromosome structure than the aceto-carmine fluids, but their use is more limited; and they can be substituted for the latter only with certain favorable material, e.g., pollen mother cells of *Rhoeo* and *Tradescantia* and salivary gland chromosomes of *Chironomus*. Some of the newer synthetic resins can be substituted for the natural balsams. Formulae are given for fixatives which contain Venetian turpentine, sandarac, Canada balsam and 2 synthetic resins.—*Auth. abst.*

PHOTOGRAPHY

18. BRUBAKER, J. D. (*Evanston, Ill.*) Relative density method of measuring unknown exposures. *Jour. Biol. Photogr. Assoc.* 10(1): 11-12, 1941.—The set up with a neutral gray area is photographed on a pan film of Weston 16 or 20 tungsten. The density of the gray area on the film is compared with standards to obtain the proper exposure for Kodachrome.—*O. W. Richards.*

19. DENT, R. V. (*Henry Lester Inst., Shanghai, China.*) Automatic lens-aperture control. *Jour. Biol. Photogr. Assoc.* 10(1): 16-19, 4 fig. 1941.—The iris control is arranged so that after focusing at full aperture, it is shifted to a predetermined smaller aperture by the exposure control just before the shutter is opened. This insures adequate depth of focus.—*O. W. Richards.*

20. FALKENSTEIN, A. P. (*Mt. Sinai Hosp., Chicago, Ill.*) A simple and timesaving method for preparation of lantern slides. *Jour. Biol. Photogr. Assoc.* 10(1): 8-10, 1941.—A copy desk is used with one light. The negatives are placed in frames. Each is exposed in proportion to its density so that the positives may be developed together.—*O. W. Richards.*

21. FOOTER, WILSON. (*Stanford U. Hosp.*) 35 mm. X-ray slides. *Jour. Biol. Photogr. Assoc.* 10(1): 13-15, 1941.—Method for making film-strip copies on Microfile film.—*O. W. Richards.*

22. HARDING, F. R. News from the trade. Simplified scientific and clinical photography with the Cameron clinical camera. *Jour. Biol. Photogr. Assoc.* 9(2): 107-110, 1940.

23. JOHNSON, GEORGE F. (*Pennsylvania State Coll.*) Recent trends in visual instruction. *Jour. Biol. Photogr. Assoc.* 10(1): 35-41, 3 fig. 1941.—Four times as many colored lantern slides were used in the Agric. Extension Service during 1937-41 as during the years 1915-37. The 2 X 2 inch slide is now more used. Motion pictures in color and 16 mm. are preferred. Miniature equipment for making these is described.—*O. W. Richards.*

24. LARSON, CARROLL B. Photography and clinicians. *Jour. Biol. Photogr. Assoc.* 9(2): 97-99, 1940.

25. LAWRENCE, A. S. C. The scientific photographer. 180p. 5 col. pl., 81 fig. Macmillan Co.: New York, 1941. Pr. \$3.75.—This book is intended to familiarize the reader with the fundamentals of photographic theory. It briefly describes various scientific applications of these principles. It contains chapters on the bases of photography, the lens and the image, the mechanism of the camera, the making of a picture, developing and printing, color photography and some scientific applications. Appendix I lists formulae for solns.; Appendix II describes the geometry of image formations.—*Courtesy Jour. Biol. Photogr. Assoc.*

26. MAINS, E. B. (*U. Michigan.*) Some notes concerning plant photography. *Jour. Biol. Photogr. Assoc.* 10(1): 3-7, 6 fig. 1941.—Methods and lighting for black and white and Kodachrome pictures are given for ordinary and photomicrographs.—*O. W. Richards.*

27. MAURER, JOHN A. (*Loyola U.*), and JAMES B. GLAZE (*U. Chicago.*) An integrated copying system for half-tone and line originals. *Jour. Biol. Photogr. Assoc.* 10(1): 20-32, 6 fig. 1941.

28. TOWNSEND, AGNES. Resolving power in micro-copying. *Jour. Documentary Reproduction* 2(2): 140-146, 4 fig. 1939.—The perfection of the final image obtained in microphotography depends on the sharpness of the images produced by the optical equipment as well as the kind of film used and on the manner in which it is processed. According to the quality of the objective the image may be relatively undistorted. Assuming that the lens is ideal a table is furnished for the depth of field yielding a circle of confusion of but 0.001 in. according to diaphragm openings and reduction ratios. The thickness and grainy structures of the film also introduce errors. In the reading machine, the same optical factors as in the camera are involved. It is necessary to assure an adequately high resolving power at each step especially when copying rare materials which may not be available for recopying.—*H. A. Harper.*

29. ANONYMOUS. Micro-filming with Eastman micro-file recordaks. 19p. Eastman Kodak Co.: Rochester, N. Y., 1940.—A general discussion of microphotography with illustrated descriptions and specifications of the Recordak equipment for documentary material including cameras, reading machines and an enlarger. Brief notes about several Recordak services are included.—*H. A. Harper.*

NATURE STUDY

30. ST. BARBE BAKER, RICHARD. Trees. A book of the seasons. 48p. 48 fig. Lindsay Drummond Ltd.: London, 1940. Pr. 10s. 6d.—Artistic studies of 48 English trees with brief notes on their natural history and more extensive quotations from literary sources. The Cedar of Lebanon and the redwood are included.—*C. A. Kofoid.*

31. TANNER, VASCO M. (*Brigham Young U.*) A chapter on the natural history of the Great Basin, 1800 to 1855. *Great Basin Nat.* 1(2): 33-61. Map, 1 fig. 1940.—Students of the natural history of the Great Basin will find the discovery and development of the West most fascinating and profitable. Scattered through the literature are to be found the beginnings out of which have grown our knowledge of the biota and its environment. Great changes have been made in this environmental complex during the past century. Several spp. have been exterminated, many reduced in numbers and greatly changed in their range, while introduced ones have over-run the basin. The wastage of animal and plant resources has gone on to such a point that we must recast all policies that affect these resources. A retrospective study, as the one at hand, helps in pointing out ways of dealing with these problems. In this study we have discussed the discovery, character, and extent of the Great Basin. The history of the buffalo in Utah is summarized. The Mormon cricket-California gull episode is reviewed and some original source material is included from the Latter-Day Saint Church Journal History. The plants and animals found in Utah by government exploring parties led by Fremont, Stansbury, and Gunnison, are discussed. Remy and Brenchley visited Utah in the fall of 1855 and made many observations on the natural history of the Great Basin. Their visit and observations are briefly reviewed. Bunch grass and sparsely scattered sagebrush were common on the islands of Great Salt Lake and in the Utah, Salt Lake, Ogden, and Cache Valleys of Utah. By the end of the year 1855, 191 plants; 611 insects; 6 fish; 7 amphibians and reptiles; 113 birds; and 93 mammal species were known to occur in the Great Basin. Utah was the type locality for 13 plants; 6 insects; 4 reptiles; 1 bird; and 2 mammal spp.—*V. M. Tanner.*

INSTITUTIONS, ADMINISTRATIONS

32. GAGER, C. STUART, et al. Thirtieth annual report of the Brooklyn Botanic Garden. *Brooklyn Bot. Gard. Rec.* 30(2): 37-189, 10 fig. 1941.—This includes the report of the director, and the administrative reports of the curators, as well as reports of the progress of scientific investigation at the Garden. Various data pertaining to the year's history of the Garden are appended.—*A. H. Graves.*

33. HAMMETT, F. S. (*Lankenau Hosp., Philadelphia.*)

41. A method of planning for basic biological research; with especial reference to cancer research. *Growth* 5(2): 161-170. 1941.—This paper presents a method of planning of research based on 4 principal aspects of living things: direction as comprised in science of genetics: substance as comprised in science of chemistry: state of substance as comprised in science of physics: and structure as comprised in science of anatomy. An example of its use is given in attempts to answer the question: "How does a cancer cell differ from a normal cell?"—Auth. abst.

34. JOHN, C. C. (U. Travancore, Trivandrum, India.) Aquarium and marine biological laboratory of the University of Travancore. *Current Sci.* 10(4): 227-231. 3 fig. 1941.—The buildings are located near freshwater streams and lakes, besides which brackish areas and the sea are adjacent. Details of buildings and equipment are described.—R. A. Muttikowski.

MUSEUMS, BOTANICAL AND ZOOLOGICAL GARDENS, AQUARIA, ETC.

35. ANDREWS, ETHAN ALLEN. (Johns Hopkins U.) Zoological gardens.—I. II. *Sci. Mo.* 53(1): 5-21. 12 fig.; 53(2): 116-132. 12 fig. 1941.—An historical sketch of the development of zoological gardens.—F. R. Hunter.

36. FROST, S. W. (Penn. State Coll.) Transparencies for certain insect and plant materials. *Jour. Econ. Ent.* 34(2): 319. 1 fig. 1941.

37. MOORE, ELEANOR M. (U. Mus., Philadelphia.) Youth in museums. ix+115p. Frontispiece, 12 pl. University of Pennsylvania Press: Philadelphia, 1941. Pr. \$2.—The author visited over 100 museums from Boston to San Diego inspecting provisions made for interesting children in their exhibits. A children's exhibit is defined as one selected, exhibited, and interpreted for children in a place set aside for them. The book discusses the aim, function, location and social affiliations of the children's museum and has chapters dealing with staff, collections, exhibits, supplementary and independent activities, publications, finances, and future possibilities.—C. A. Kofoid.

38. SHIRLEY, HARDY L. A primeval laboratory in Penn's woods. *Sci. Month.* 53(3): 290-293. 4 fig. 1941.—A description of an essentially virgin, hemlock-beech forest in northwestern Penna. set aside by the U. S. Forest Service for scientific use, education and recreation.—F. R. Hunter.

39. TELFORD, HORACE S. (N. Dakota Agric. Coll.) A convenient mount for insects. *Jour. Econ. Ent.* 34(2): 320. 1 fig. 1941.

40. WHEATLEY, M. D. (State U. Iowa.) Preservation of biological specimens with isobutyl methacrylate polymer. *Science* 94(2428): 49-50. 1941.—Describes the successful preservation of grasshoppers, butterflies, and frogs up to 6 inches in length; also leaves, and fragile bones. "Each particular kind of material has to be treated in a manner suitable for its own needs."—M. A. Raines.

ETHNOBIOLOGY

(See also [in B. A. 15(9)] the following entries: Maoris, 21042; Grain in Neolithic Europe, 21220; Glacial vegetation, Europe, 21220; Pollen analysis in Tyrolean Alps, 21727; In Germany, 21230; Race and culture of Argentinian aborigines, 22029; Ainu, 22040; European races, 22047, 22050; Prehistoric diseases, Costa Rica, 22238; Tree-ring data in Norway; (10): Origin of maize, 23085; Tree-ring analysis in Mississippi Basin, 23170; Ceylon, 23778, 24492; Origin of barley, 24205; Land environment at Chelles, 24589; and in this issue: Origin of Nicotiana tabacum, 200; Post-glacial history of British vegetation, 408; Plants of Maya region, 2393; Cranial materials from central Europe, 1236; Vegetables of S. India, 2608; Fish poison of California Indians, 2726.)

41. ADAMETZ, LEOPOLD. Ursprung und heutiges Vorkommen der Rasse der Gérgentiziege und ihre Beziehungen zur Angoraziege. *Zeitschr. Zücht. Reihe B: Tierzücht. u. Züchtungsbiol.* 48(1): 1-16. 7 fig. 1940.—A discussion, largely based on size and shape of horns, of the origin and racial characteristics of the goats of Gérgenti in Sicily. The author finds these goats similar to those of Mesopotamia in the 4th millennium B.C. and believes the Gérgenti goats were derived from those, although the intervening history is not clear.—J. L. Lush.

42. BRYAN, KIRK. (Harvard U.) Geologic antiquity of man in America. *Science* 93(2422): 505-514. 1941.—The problem of the antiquity of man in America has lost its heretofore hypothetical character. It has become a series of detailed problems involving the antiquity of several Paleo-Indian cultures. These cultures, when better known, can be tied to each other archeologically. Also each site studied by geologic methods contributes to a general geologic chronology in step with the rhythm of climatic conditions.—E. J. Umberger.

43. FRIEDMANN, HERBERT. (U. S. Nation. Mus.) Bird bones from Eskimo ruins at Cape Prince of Wales, Alaska. *Jour. Washington Acad. Sci.* 31(9): 404-409. 1941.—33 spp. of birds were represented in the bones dug up at several sites ranging in age from 50 to 1,500 yrs. No unusual records were found among them.—Herbert Friedmann.

44. HARLEY, GEORGE WAY. (Ganta Dispensary, Liberia.) Native African medicine. With special reference to its practice in the Mano Tribe of Liberia. xvi+294p. Frontispiece, Map. Harvard University Press: Cambridge, 1941. Pr. \$3.50.—This book deals with the medicines used in the treatment of various diseases among the Mano, an agric. people in the hinterland of Liberia. It is based on the author's field research among this native population which is well known to him as a practitioner of tropical medicine. The author has not only endeavored to evaluate the various medicines in the light of modern medical knowledge, but has also investigated the Mano's conceptions and interpretations of diseases which are closely interwoven with their supernatural and magical beliefs. In regard to the treatment of diseases the author distinguishes between (1) rational, (2) magical and (3) mixed treatment and examines some 100 diseases and their treatment from these points of view. 15 chapters are devoted to the description of the Mano's conceptions of diseases as well as their medicines used and it is shown that many of the drugs have practical curative value, although their application (as well as the occasional use of surgery) is deeply shrouded in magical procedures. Medical treatment is primarily in the hands of professional medicine-men, although many useful remedies are utilized in the routine care of the family by every old woman. In a supplementary chapter the author compares his own findings with those in other parts of the African continent and an appendix presents excerpts from the literature regarding a few African medicines. A bibliography and a botanical list of medicinal plants conclude the book.—H. A. Wieschhoff.

45. JONES, VOLNEY H. (U. Michigan.) The nature and status of ethnobotany. *Chron. Bot.* 6(10): 219-220. 1941.

46. PIA, D. J. JULIUS. (Hochschule für Bodenkultur, Vienna.) Rassenkundliche Untersuchungen an Schädelresten des altägyptischen Hausrindes. *Zeitschr. Zücht. Reihe B: Tierzücht. u. Züchtungsbiol.* 48(1): 17-55. 14 fig. 1940.—The skulls investigated are from 3000 yrs. from 2500 yrs. and from 1000 yrs. or less B.C. The skulls show prevailingly *primigenius* characteristics, the important deviations being tentatively imputed to the introduction of Mongolian blood. Among living races of cattle, the Hungarian steppe race most closely resembles these Egyptian cattle.—J. L. Lush.

47. WHITE, LESLIE A. (U. Michigan.) Nicotiana rustica cultivated by Pueblo Indians. *Science* 94(2429): 64-65. 1941.

48. WHITE, LESLIE A. (U. Michigan.) The cultivation of cotton by Pueblo Indians of New Mexico. *Science* 94(2433): 162. 1941.

49. YUNCKER, T. G. Kava, its preparation and use. *Proc. Indian Acad. Sci.* 50: 69-71. 1941.—From the fleshy, root-like base of *Piper methysticum* the Polynesians prepare a beverage known as kava. There is usually considerable ceremony and ritual associated with the prepn. and drinking of kava, the origin of which is apparently ancient. The author describes the methods of prepn. and its use as observed while in the Samoan and other south sea islands.—Auth. summ.

TEXTS AND EDUCATION

50. BAITSELL, GEORGE ALFRED. (Yale U.) Manual of biology. 6th ed. ix+449p. 12 pl. Macmillan Co.: New York, 1941. Pr. \$2.75.—The 6th edition of this text has

again emphasized the "type" attack on the problem of presenting the facts of biology to the beginning student. As in earlier editions, the material has been carefully correlated with the companion volume, *Foundations of Biology* (6th Ed.) by L. L. Woodruff. This volume emphasizes the "principles" of biology and should be used with the *Manual*. Besides giving valuable physiological data associated with their proper morphological features of selected representatives of each of the plant and animal groups, a laboratory outline emphasizing the structural aspects of each form studied in the text is a part of the book. This edition is a worthy successor of the earlier printings of a very useful introductory college biology text.—A. C. Walton.

51. ELLIOTT, ALFRED M. Laboratory guide for animal biology; the invertebrates. 43p. Burgess Publishing Co.: Minneapolis, 1941.

52. MAW, W. A. (*Macdonald Coll.*) Teaching agriculture to adult groups by the discussion method. *Poultry Sci.* 20(5): 466. 1941.—An abstract.

53. STRANDSKOV, H. H. Heredity. (Film.) 360 ft., sound. Eripi Classroom Films, Inc.: Long Island City, N. Y., 1939. Pr. \$40.—The first part of this talking film consists of animated diagrams which show the principal phases of mitosis and meiosis. The 2d part demonstrates the Mendelian principles of dominance, recessions, incomplete dominance, and segregation, using monohybrid and dihybrid crosses in cattle and guinea pigs, respectively.—L. F. Beck (*courtesy Psychol. Abst.*).

MISCELLANEOUS

54. ALEXANDER, F. MATTHIAS. The universal constant in living. With an appreciation by G. E. COGHILL. xlii+270p. E. P. Dutton and Co., Inc.: New York, 1941. Pr. \$2.50.—This is a system of educational methods in physical culture founded upon 3 biological principles, (1) that of the integration of the whole organism in the performance of particular functions, (2) that of proprioceptive sensitivity as a factor in determining posture, and (3) that of the primary importance of posture in determining muscular action. The habitual use of an improper reflex mechanism in sitting, standing, and walking introduces conflict in the nervous system and this conflict is the cause of fatigue and nervous strain which bring many ills in their train. The author's methods relieve this conflict between the total pattern, which is hereditary and innate, and the acquired reflex mechanisms and thus correct not only postural habits but other pathological conditions not ordinarily recognized as consequences of such habits. This correction is the work of the individual as a whole. The topics discussed include the influence of manner of use of the body upon good or ill, and in relation to diagnosis and disease, and to change. A critique of the report of the Committee of the British Medical Association on Physical Culture and a technique for prevention of improper posture are offered. The prevalent "stupidity in living" is attacked.—C. A. Kofoid.

55. ALLEMAND-MARTIN, M. Aperçu géographique, géologique et économique sur les côtes orientales tunisiennes: Les îles Kerkenna et la petite Syrte. *Bull. Mens. Soc. Linn. Lyon* 9(4): 56-63. 4 fig. 1940.

56. ALLEMAND-MARTIN, A. Les îles Kerkenna: Aperçu géographique, géologique et agricole. *Bull. Mens. Soc. Linn. Lyon* 9(7/10): 119-125. 1940.—The recent terrestrial and marine floras and faunas of the Kerkenna islands (near Tunis) are listed.

57. CAESAR, G. V., and M. L. CUSHING. (*Stein Hall and Co., New York.*) The starch molecule. *Jour. Phys. Chem.* 45(5): 776-790. 9 fig. 1941.—Following a review of work on the structure, size and spatial configuration of the starch molecule, including the rôle of d-glucose and possible

derivatives of d-glucose, the number of units in a single amylose chain, the authors present their conclusions based on a study of Fisher-Hirschfelder atomic models and physical and chemical data that cellulose has a straight-chain and amylose a helical spring configuration. There are 61 references.—H. Branson.

58. FISHER, HARRY L. Rubber and its use. xvi+128p. Frontispiece, map, 16 fig. Chemical Publishing Co., Inc.: Brooklyn, 1941. Pr. \$2.25.—The author's activities as a research chemist enable him to discuss the chemistry of rubber and that of its synthetic substitutes, the elastomers, butadiene, buna, neoprene, thiokol, vistanex, and koroseal. The book deals with the history of the rubber industry; the sources and production of crude rubber; the properties of crude and vulcanized rubber; the processes of compounding and vulcanizing of rubber by the use of activators, retarders, antioxidants, reinforcing agents, fillers, coloring agents, softeners, plasticizers, and stiffeners; manufacturing rubber and rubber goods; latex manufacturing processes; and rubber derivatives. An annotated bibliography is appended.—C. A. Kofoid.

59. JONES, G. NEVILLE. (*U. Illinois.*) How many species of plants are there? *Science* 94(2436): 234. 1941.—The approximate total number of different species of known living plants is slightly in excess of 335,000.—E. J. Umberger.

60. SLEGGS, G. F. (*Memorial U. Coll., St. Johns, Newfoundland.*) The form of pigmentation markings. *Growth* 5(1): 53-59. 4 fig. 1941.—The paper presents an application of differential periodicity to a crystallography of the organism. By interpenetrating systems of evenly spaced points round which circles are drawn for graphical representation of the properties of the field configurations are produced resembling pigmentation markings and in some cases patterns of considerable extent. A pigmentation marking, whether it be in the form of a spot, stripe, reticulum, crescent or ocellus, is a configuration in a differential periodic field, its periphery being formed of arcs belonging to systems of regularly spaced circles; the systems may be identical and variously inclined. An explanation is reached of the cusping and zigzagging of stripes, the coexistence of stripes and spots and of other peculiarities impossible to define or analyse in the absence of a geometrical concept. The origin of the periodic components is to be found in the molecular structure of the gene column in which a succession of variously orientated protein lattices is postulated on the basis of modern cytological fact and on the correspondence which exists between the geometrical properties of the extended system and fundamental biological properties. By integrating the primary patterns formed by the interactions of these morphogenetic lattices gross final patterns can be explained on various size scales, the ability of the theory to explain similitude being of fundamental importance. The incommensurability of the inclined lattices, permitting no interconnection by valencies in regular formation, leads to chemical strain which is the basis of the high synthetic activity of the gene column.—G. F. Sleggs.

61. TULEEN, LAWRENCE F., WILLARD L. MUEHL, and GEORGE S. PORTER. (*J. Sterling Morton High Sch. and Junior Coll., Cicero, Ill.*) Test it yourself! Chemistry experiments with consumer applications. vi+280p. Illus. Scott, Foresman and Co.: Chicago, 1941. Pr. \$96.—This is a terse and succinct account of methods of measuring and testing household chemicals; cleansers and softeners; foods; drinks; tooth powders; antiseptics, alkalinizers, laxatives, and pain killers; cosmetics; textiles; fuels; lubricants; antifreezes; paints, varnishes and shellacs, metal polishes and electroplatings; inks, dyes, and methods of removing stains; and soils with reference to acid and alkaline reactions; relation to root formation, plant growth and maturity, and substances which inhabit and interfere with plant growth.—C. A. Kofoid.

BIOGRAPHY AND HISTORY

CARROLL W. DODGE, *Editor*

(See also Entries 35, 341, 415, 457, 1830, 1860, 1913, 2256, 2546, 3001)

HISTORY

62. ACOSTA, JOSEPH de. Historia natural y moral de las Indias en que se tratan las cosas notables del cielo,

y elementos, metales, plantas y animales dellas: y los ritos y ceremonias, leyes y gobierno, y guerras de los Indios. lxxxv+633p. Fonda de Cultura Económica: Ave. Madero

32. México, 1940.—This Mexican reprint of the edition of 1590 contains an introduction by EDMUNDO O'GORMAN, discussing the underlying philosophy of Acosta in regard to natural phenomena, his concept of history and his use of Spanish rather than Latin. A brief biography of Acosta (1539-1600) is followed by bibliographies of works cited by Acosta, a complete bibliography of the editions of his works and one of the works cited by the editor in preparing his introduction. This edition provides an inexpensive text of a rare work. Chapters 16-42 of Book 4 (p.264-343) are of especial interest to students of botany and zoology.—C. W. Dodge.

63. ALEXANDER, WILLIAM H. (*Normandie Hotel, Columbus.*) The Ohio Academy of Science (mostly historical). *Ohio Jour. Sci.* 41(4): 288-304. 7 pl. 1941.

64. HEATON, C. E. A historical sketch of New York university, College of medicine, 1841-1941. 29p. New York University: New York, 1941.

65. HERRICK, JAMES B. Certain text-books on heart disease of the early nineteenth century. *Bull. History Med.* 10(2): 136-147. 1941.—A surprising number of text-books on heart disease appeared during the Napoleonic Wars between 1806 and 1818. The authors were Corvisart in France, Allan Burns in Scotland, Testa in Italy, Hodgson in England, and Kreysig in Germany. Of these Hodgson was the most scholarly. Burns was the first to write in English a work devoted entirely to this field. Corvisart marks a distinct advance over any work on the subject previously written. His was the most widely known treatise in the early 19th century.—Sister M. E. Keenan.

66. HUME, EDGAR ERSKINE. Medical work of the Knights Hospitallers of Saint John of Jerusalem. 371p. Johns Hopkins Press: Baltimore, 1940. Pr. \$3.

67. JACOBS, WALTER H. (*Rockefeller Inst. Med. Res.*) Description of the teeth by Alexander Monro, Primus. *Bull. History Med.* 10(2): 195-198. 1941.—This study presents a brief résumé of several extracts from the dental writings of Monro. The source used is the 6th edition of his *Anatomy of the Human Bones and Nerves* (Edinburgh, 1758), an excellent work which shows extensive reading and accurate observation.—Sister M. E. Keenan.

68. MARTÍNEZ DURAN, CARLOS. Las ciencias médicas en Guatemala. Origen y evolución. 439p. 33 pl. Tipografía Sánchez y De Guise: Guatemala, 1941.—The author discusses the knowledge of medicine among the Indians at the time of the conquest from a study of their vocabulary of anatomy, diseases, physiology, pathology, surgery and therapeutics and gives notes on epidemics recorded in their literature. In his discussion of syphilis, he follows the arguments of Mariano Pádilla, *Ensayo histórico sobre el origen de la enfermedad venérea o de las bубas y de su antigüedad tanto en Europa como en América*. Guatemala, 1861. The 2d brief part discusses the lack of medical care during the conquest and records the founding of the first hospital at Almolonga. The 3d part outlines the state of medical knowledge in the 16th and 17th centuries in Spain, gives such data as have survived of the life and work of physicians, surgeons and pharmacists, histories of epidemics and of the founding and work of the hospitals during the period from the founding of Antigua (1540) to the establishment of the university. The 4th part outlines the steps in the founding of La Real y Pontificia Universidad de San Carlos Borromeo, growing out of the Colegio de Santo Tomás de Aquino (1622-31) a bequest in 1646, a royal charter in 1676, the formal opening in May 1681 and the papal charter in 1687. Medical instruction began in the fall of 1681 with Nicolás de Souza (-1711) as interim professor until 1687, continued with Miguel Fernández until 1712, graduating V. Ferrer González in 1703 and José de Medina (-1744) in 1712, who succeeded to the chair and graduated five (1723-25); after a period of petty quarrels one of these, Manuel Trinidad de Avalos y Porres (-1775), emerged as professor and introduced experimentation in his teaching (blood transfusions and transmission of disease by inoculation with blood from infected animals) as well as developing anatomy and surgery. Four students graduated 1753-6 and one José Felipe Flores in 1773 who succeeded to the chair, developing demountable wax anatomical models some years before they were developed independently in Europe and gaining a reputation by additions

to *materia medica*; in 1797 he traveled in Europe and settled in London, having graduated 8 students of whom José Antonio de Córdova filled his place while he was on leave (1797-1804), graduating 6 students. Narciso Esparragoza y Gallardo (1759-1819), a Venezuelan, came to Guatemala in 1788, rising rapidly in surgery, and began lectures in that field, graduating his first student in 1798 and developing obstetrical techniques and forensic medicine, introducing vaccination in 1804, the year he became head of the newly founded Real Colegio de Cirugía which was merged with the university during the educational reforms of Pedro Molina (1777-) in 1820. These were short lived as the university almost disappeared during the troubled times of revolution and civil war, to be revived in the reorganization of Galvez in 1832 as the Academia de Estudios and finally evolving as the Facultad de Medicina after 1840. Besides the main outlines of the development of the study of medicine and surgery, there is much information on the various epidemics and measures taken for their control, the development and administration of hospitals and pharmacies, introduction of inoculation and vaccination for small pox, and of anaesthetics, with biographical notes of the medical men involved. There is also original information on the expedition of Sessé and Mocino in the early 19th cent. and the study of natural history and museums in connection with the Sociedad de Economía. After the close of the colonial period, the treatment is increasingly sketchy. The work is carefully documented with quotation and citation of papers in the government archives and illustrated with portraits, diplomas, specimens of handwriting etc. Unfortunately the work lacks a detailed index.—C. W. Dodge.

69. MOURAD, Y. *La physiognomonie arabe et le Kitab-al-firasa*, 162p. Geuthner: Paris, 1939. Pr. 120 Frs.—An historical account of physiognomy as found in ancient and medieval Greek and Arab writings is presented. Physiognomy was used to judge the character of slaves to be purchased. The Arab concept of *firasa*, which means insight enabling one to judge others at a glance, is compared to the *Einsicht* of the Gestaltists. The neobehaviorist theories of the whole-part character of behavior bear some resemblance to the concept of *complexo* of the medieval physicians. 50 pages are devoted to the translation of a rare 13th century manuscript which is followed by the Arab text. Part 1 deals with the difference between mystical intuition and *firasa*, the relationship between physiognomy and medicine, the influence of climate and diet on character, and the parallelism between certain human and animal physiognomic types. Part 2 deals with temperaments (reflecting the influence of Hippocrates and Galen), the psychological differences according to the 4 ages of man, the character of noblemen and rich people, and the differences between people from warm and from cold countries. Part 3 deals with the significance of the limbs according to their shape, size, color, etc. Notes and commentaries explain the text; a bibliography of 9 pages, including Arab, Persian, and Latin manuscripts, and Arab, Italian, French, and Latin printed texts of the Middle Ages and the Renaissance, as well as the most recent writings, is given.—C. Nony (courtesy *Psychol. Abst.*).

70. ROBINSON, VICTOR. (*Temple U.*) Chronology of otology. *Bull. History Med.* 10(2): 199-208. 1941.—This is a partial chronology beginning with the 6th century B.C. and concluding with A.D. 1924.—Sister M. E. Keenan.

71. RUZSKII, M. D., et al. (*Tomsk U.*) [Report of the work of the Zoological Section of the Tomsk Society of Observers of Nature, 1933-1937.] *Trudy Biologicheskogo Nauchno-Issledovatel'skogo Instituta. [Tomskii Gosudarstvennyi Universitet] (Trav. Inst. Sci. Biol. Univ. Kouibycheff Tomsk)* 4: 291-319. 1937.—Proceedings of meetings, bibliogr. of 31 titles pubd. by members, 1933-1937, and abstracts of papers presented at meetings. The latter include zool. and hydrobiol. work in Siberia, the work of the Karachinsk Nat. Hist. Museum (founded 1923), and biographical sketches of several zool. investigators of Siberia, including Edward Alexandrovich Eversman (1794-1860), Alexander Fedorovich Middendorf (1815-1894), Nikolai Feofanovich Kashchenko (1855-1935), Gustav Ivanovich Radde (1831-1901), and Alexei Nikolaevich Severtzov (?-1936).—J. R. Carpenter.

72. SARTON, GEORGE. The history of medicine versus the history of art. *Bull. History Med.* 10(2): 123-135. 1941.—The chief duty of the historian of science is to revive personalities, but the personality of a scientist can survive only in so far as he is also an artist. Artistic traditions, in that they are more tangible than purely scientific ones, are often of great value to the historian of medicine. Alexander von Humboldt was the first to realize the polarity of arts and sciences. Today there is great need of a man of unusual intellectual and artistic endowment to write the story of the mutual interrelations between science, art, and religion. These 3 aspects must be considered if we are to understand the mystery of life, and this means (1) that we must drop our scientific conceit and (2) that we must never subordinate humanities to technicalities.—*Sister M. E. Keenan.*

BIOGRAPHY

73. ALEXANDER, C. P. Frederick Wallace Edwards [1888-1990]. *Canadian Ent.* 73(5): 94-95. 1941.

74. BEREZHKOVS, R. P. [The scientific work of M. D. Ruzskii.] *Trudy Biologicheskogo Nauchno-Issledovatel'skogo Instituta. [Tomskii Gosudarstvennyi Universitet]* (Trav. Inst. Sci. Biol. Univ. Kouibycheff Tomsk) 4: 1-6. 1937.—Biographical sketch of Mikhail Dmitrievich Ruzskii (1864-) of Tomsk Univ., on the occasion of the 50th anniversary of his first scientific work. Portrait.—*J. R. Carpenter.*

75. COLLIP, J. B. Frederick Grant Banting, November 14, 1891—February 21, 1941. *Sci. Month.* 52(5): 473-474. 1941.

76. DESIO, ARDITO. Ernesto Mariani [1863-]. *Atti Soc. Ital. Sci. Nat.* 79(1): 11-19. 1940.—Italian geologist and paleontologist. A bibliography of his papers—some 78 titles—is given.

77. DETLING, LeROY E. Albert Raddin Sweetser (1861-1940). *Madroño* 6(1): 20-21. Portrait. 1941.

78. ECKMAN, JAMES. (Mayo Clin., Rochester, Minn.) Alexander J. Stone, M. D., L. L. D. Founder of Minnesota's first Medical Journal. *Ann. Med. History* 3(4): 306-325. 1941.—Stone was born (1845), reared, educated and married in New England settling later in Stillwater, Minnesota, where he established a practice and founded the *Northwestern Medical and Surgical Journal* (1870). Details as to the establishment, printing, contents, format, et cetera of this journal are given in this paper along with comments concerning contemporary medical journals. Dr. Stone's association with the *Northwestern Lancet* and with medical education in Minnesota, culminating in a professorship of gynecology in the University of Minnesota College of Medicine, is outlined. His surgical accomplishments, membership in medical societies, local and state positions, political activities, glimpses into his personal life and his death (May 12, 1910) are recorded.—*L. F. Edwards.*

79. EMILIO, S. G. Rodman Armitage Nichols [1884-1919]. *Auk* 57(4): 599. 1940.

80. FISHER, A. K. Arthur Camp Stanley [1883-1940]. *Auk* 57(4): 599. 1940.

81. GIBSON, THOMAS. (Queen's U., Kingston, Ontario.) The iconography of Sir Theodore Turquet de Mayerne, M. D., Baron of Aubonne, physician to three kings—diplomatist, chemist, and clinical case recorder. *Ann. Med. History* 3(4): 288-296. 1941.—The various portraits, engravings and a miniature in enamel of Mayerne are described and illustrated. A brief biographical sketch of Mayerne (1573-1655) is appended.—*L. F. Edwards.*

82. GROVER, FREDERICK. Mary Fisk Spencer. *Madroño* 6(3): 82-84. Portrait. 1941.—Mary Fisk Spencer, a musician and botanical collector, was born at Brecksville, Ohio, in 1841 and died at San Diego, California, December 27, 1940. Her herbarium, consisting of 12,000 plants from Central and Southern Europe, accumulated during her long residence abroad, and a California collection of 3,000 plants was donated to Oberlin College as a memorial to Professor James Dascomb of that institution.—*Ethel Crum.*

83. HRDŁIČKA, ALES. (U. S. Natl. Mus.) Eugene Dubois, 1858-1940. *Sci. Month.* 52(6): 578-580. 1941.—Discovered skull cap of *Pithecanthropus erectus*.—*F. R. Hunter.*

84. KAGAN, SOLOMON R. Leaders of medicine. Biographical sketches of outstanding American and European physicians. 176p. 4 portraits. Medico-Historical Press:

Boston, 1941. Pr. \$3.—This book contains brief biographies of Henle, Virchow, S. Weir Mitchell, Abraham Jacobi, Allbutt, Solis-Cohen, Billings, Cohnheim, Weigert, Osler, Welch, and Ehrlich. Many letters of some of these physicians are quoted. The principal works and the major contributions to the medical and biological sciences of each of these eminent physicians are cited.—*C. A. Kojoid.*

85. LAER, von. Professor Hugershoff. *Ein Nachruf. Forstarchiv* 17(7/8): 131-135. Portrait. 1941.—Carl R. Hugershoff (1882-1941) professor of surveying and photogrammetry at Tharandt and Dresden, renowned for his contributions to the science of photogrammetry and his invention of the autokartograph (aerotopograph) for making maps from aerial photographs.—*W. N. Sparhawk.*

86. LAPICQUE, L. Décès de M. Auguste Petit. *Compt. Rend. Soc. Biol.* 132(24): 184-186. 1939.

87. LEOPOLD, ALDO, and F. N. HAMERSTOM, Jr. John S. Main. *Wilson Bull.* 53(1): 31-32. 1941.—An obituary of John S. Main, Wisconsin ornithologist, with a bibliography of his writings.—*P. Brodkorb.*

88. LOHWAG, H. Viktor Litschauer zum Gedenken. *Ann. Mycologici* 38(2/4): 89-91. Portrait. 1940.—Obituary notice of Austrian mycologist Viktor Litschauer (1879-1939), with bibliography.—*E. K. Cash.*

89. LOOSER, GUALTERIO. (Santiago, Chile.) At the bicentennial of the birth of the South American naturalist Molina. *Chron. Bot.* 6(11): 250. 1941.—Juan Ignacio Molina (1740-1829), a Jesuit expelled from Chile, wrote and taught in Italy, and established many new genera and spp. of plants and animals.—*L. J. Gier.*

90. LUCKHARDT, ARNO B. (U. Chicago.) Tribute to Dr. Gideon Wells, investigator, scholar, teacher (magister). *Amer. Jour. Path.* 17(5): 643-644. 1941.

91. MCATEE, W. L. Gurdon Trumbull [1841-1903]. *Auk* 57(4): 597-598. 1940.

92. McWILLIAM, JOHN M., and CASEY A. WOOD. The James Craw portrait of Alexander Wilson. *Auk* 58(2): 236-238. 1 pl. 1941.

93. MANTEL, KURT. (Forstliche Hochschule, Tharandt.) Max Endres. Eine Darstellung seines Lebens und Wirkens als Beitrag zur Geschichte der Forstwissenschaft. *Forstwiss. Centralbl.* 63(1): 1-19; (2): 30-42. Portrait. 1941.—Endres (1860-1940) was dozent and professor of forestry at Karlsruhe Technische Hochschule 1886-1895; professor at Univ. Munich 1895-1930; rector magnificus 1907-1908; dean of economic faculty 16 yrs., member University Senate 13 yrs.; member Reichsforstwirtschaftsrat 1919-1934; co-editor Forstwiss. Centralbl. 1915-1940; ed. Holzhandelsblatt 1918-1938; best known for his work in the field of forest policy, especially his monumental *Handbuch der Forstpolitik* (1905 and 1922). Bibliography.—*W. N. Sparhawk.*

94. MINIO, MICHELANGELO. Sui craatteri dell' opera botanica del veneziano Pietro Antonio Michiel dall' analisi del suo codice-erbario (sec. XVI). [The quality of Michiel's botanical work as shown in his Codice-Erbario.] *Nuovo Gior. Bot. Ital.* 47(4): 649-661. 2 pl. 1941.—An appreciation of Michiel's accuracy in description, with a reproduction of 2 of his plates.—*Francis Ramaley.*

95. MÜLLER, KARL. Johannes Behrens. *Zentralbl. Bakt. II. Abt.* 103(1/5): 39-42. 1940.—Obituary of the late director of the government biological institution for agriculture and forestry in Berlin-Dahlem.—*W. B. Sarles.*

96. NEGRI, GIOVANNI. Augusto Béguinot (1875-1940). *Nuovo Gior. Bot. Ital.* 47(4): 718-749. Portrait. 1941.—A fully documented account of the botanical work of Béguinot, accomplished botanist of wide interests, known chiefly for his studies in phytogeography and floristics.—*Francis Ramaley.*

97. NEIVA, ARTHUR. (Inst. Oswaldo Cruz.) Lauro Travassos. *Livro Jub. Prof. Lauro Travassos* 1938: i-xviii. 1938.—Biography and appreciation, with list of his publications (215 titles), mainly in helminthology.

98. OLMSTED, CHARLES E. (U. Chicago.) George Elwood Nichols. *Ecology* 22(3): 235-236. Portrait. 1941.—An account of the life and work of this noted ecologist and bryologist. A recent portrait with Nichols' signature is reproduced.—*C. E. Olmsted.*

99. PEMBERTON, C. E., and R. H. van ZWALUWENBURG. Howard Francis Willard. Biographical sketch. *Proc. Hawaiian Ent. Soc.* 10(3): 447-449. 1939(1940).

100. PICK, E. P. Hans Horst Meyer (1853-1939). *Jour. Pharmacol. and Exp. Therap.* 71(4): 301-304. 1 fig. 1941.

101. PINNER, MAX. Allen Kramer Krause (1881-1941). *Amer. Rev. Tuberc.* 44(2): 248-253. 1 fig. 1941.—Distinguished American physician, noted for work on tuberculosis; for many years editor of the *American Review of Tuberculosis*.

102. POSTELL, W. D. (Louisiana State U.) Erasmus Darwin Fenner and the beginnings of medical literature in Louisiana. *Ann. Med. History* 3(4): 297-305. 1941.—The active career of Dr. Fenner (1807-1866) is outlined, including the fulfillment of his urgent desire to establish the *New Orleans Medical Journal* (May 1844), now the *New Orleans Medical and Surgical Journal*; the publication of *Southern Medical Reports* (2 volumes—1849, 1850) from which Sir William Osler drew inspiration for his "Alabama Student" and his coeditorship (1857-1860) of the *New Orleans Medical News and Hospital Gazette*. In addition to his medical journalistic activities he was active in local and state medical societies, was a representative to the first meeting (New York, 1846) of the Amer. Med. Assoc., served on several important health committees, published 2 lengthy medical articles, was Dean of the New Orleans School of Med. (1856-1866) in which he instituted several significant innovations in medical teaching and found time to attend sick and wounded Louisiana soldiers during the War Between the States.—L. F. Edwards.

103. REHN, JAMES A. G. (Acad. Nat. Sci., Phila.) In memoriam: Witmer Stone. [1866-1939.] *Auk* 58(3): 299-313. Portrait. 1941.—Distinguished Pennsylvania naturalist, noted for work in ornithology, mammalogy and botany.

104. ROOKSBY, ELLEN. Charles Francis Saunders. *Desert Plant Life* 13(4): 74. 1 fig. 1941.—Author of 12 books and contributing editor of *Desert Plant Life* magazine died in May, 1941. The most widely read of his several botanical books, written in popular style but with regard for technical accuracy, is "Western Wild Flowers and Their Stories."—R. H. Peebles.

105. SHERMAN, H. C. Mary Swartz Rose (1874-1941). *Jour. Biol. Chem.* 140(3): 687-688. 1941.

106. STEINER, HANS. Hofrat Professor Dr. Gustav Köck [1879-1939]. *Phytopath.* 31(10): 867-870. Portrait. 1941.—Distinguished Austrian phytopathologist, died in 1939 at the age of 60 years.

107. STIMSON, DOROTHY. (Goucher Coll.) Christopher Wren, F. R. S. *Sci. Month.* 53(4): 360-367. 1941.—A brief

biographical sketch which includes a description of some of his biological discoveries.—F. R. Hunter.

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109. SWEZEY, O. H. W. R. R. Potter. Obituary note. *Proc. Hawaiian Ent. Soc.* 10(3): 455. 1939(1940).

110. TANNER, VASCO M. (Brigham Young U.) Dr. Henry Clinton Fall (1862-1939). *Great Basin Nat.* 1(2): 62. 1940.—A brief report is given of the works and activities of this distinguished student of the Coleoptera.—V. M. Tanner.

111. TANNER, VASCO M. (Brigham Young U.) Willis Stanley Blatchley (1859-1940). *Great Basin Nat.* 2(1): 33-35. 1941.—This review gives a report on Blatchley's works and activities.—V. M. Tanner.

112. TAVERNER, P. A. James Henry Fleming. [1872-1940.] *Canadian Field-Nat.* 55(5): 63-64. Portrait. 1941.—Canadian ornithologist.

113. WADE, J. S., and J. A. HYSLOP. (U. S. Bur. Ent.) Obituary notice of Samuel Henshaw. *Proc. Ent. Soc. Washington* 43(5): 108-110. 1941.—American coleopterist; born in Boston, 1852; associated with the Museum of Comparative Zoology at Harvard since 1891; died 1941.—M. H. Hatch.

114. WALLER, ADOLPH E. (Ohio State U.) Professor John Henry Schaffner. *Ohio Jour. Sci.* 41(3): 253-286. 1941.—A brief biographical sketch of a widely known botanist and a complete citation of his more than 300 published works. He was the first botanist to observe and interpret the reduction division in plants, done during his researches on *Lilium*. His contributions during his long active life cover many fields in plant science.—A. Waller.

115. ANONYMOUS. Appreciations of the editor emeritus. *Amer. Jour. Publ. Health* 31(1): 1-9. Portrait. 1941.—Appreciation of Dr. Mazýck P. Ravenel, for 16 yrs. Editor of the American Journal of Public Health.

116. OBITUARY. Edward Murray East. *Chron. Bot.* 6(11): 261-262. Portrait. 1941.—Died Nov. 9, 1938.

117. OBITUARY. Thomas Henry Jones (1885-1941). *Jour. Econ. Ent.* 34(2): 328. 1 fig. 1941.

118. OBITUARY. Lee Abram Strong. *Jour. Econ. Ent.* 34(3): 479-480. Portrait. 1941.

119. OBITUARY. Maude Elizabeth Seymour Abbott (1869-1940). *Jour. Path. and Bact.* 52(3): 387-400. 1 pl. 1941.—Canadian pathologist.

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EILEEN R. CUNNINGHAM, *Editor*

(See also Entries 28, 62, 69, 78, 172, 973, 2405, 2539, 2705, 3011, 3267)

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121. McVAUGH, ROGERS, and F. R. FOSBERG. Index to the geographical names of Nevada. *Contr. Flora Nevada, Div. Pl. Explor. and Introd.*, Bur. Pl. Indust., U. S. Dept. Agric. 29. 1-216. 1941.—An alphabetical list of names of places in Nevada, with an outline reference map upon which these places may be located by means of data given with the place names. An introduction which discusses the manner of preparation and the use of the list is included, with a list of 102 maps used as sources of names. The counties in which localities lie are indicated in many instances. The maps include both current and older maps. Several hundred place names which are used by botanists or others but which have never appeared on any maps known to the authors are included in the list.—R. W. Pohl.

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124. ANONYMOUS. Catalogue of works. 36p. H. K. Lewis and Co., Ltd.: London, 1941.

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EVOLUTION

ALFRED EMERSON, *Editor*

(See also Entries Nature of gene mutations, 170; Origin of polyploidy in *Galax* (Diapensiaceae), 177; Origin of *Nicotiana tabacum*, 200; Speciation in *Phaseolus*, 207, in *Drosophila*, 249, in brine shrimps, 389, in legume-nodule bacteria, 2018, in sawfly, 3072, on *Junco*, 3402; Symposium on polyploidy, 215; Polyploidy, 220; Role of polyploidy in flower-insect adaptation, 226; Induced mutation, 240; Population of *Drosophila* in U. S., 263; Gall wasp (*Biorhiza*), 267; Dauermodifikationen in *Colpoda*, 284; Mutation in *Drosophila*, 288; Race concept in man in light of genetics, 329; Evolution of cranial capacity in Primates, 1249, of human skull, 1253, of invertebrate integuments, 1824; Inheritance of parasite resistance in fowl, 1453; The stamen, 2425; Mutation in viruses, 2911; Flagellates, 3198; Foodplant-selection by slugs, 3244; Zoogeography of Cuban land mollusk, 3254)

127. BROOM, R. (*Transvaal Mus., Pretoria.*) The origin of man. *Nature [London]* 148(3740): 10-14. 1941.—Evidence is given to show that man arose in Middle or Upper Pliocene times from a large Australopithecine ape.—E. D. Crabb.

128. CROW, J. F. (*U. Texas, Austin.*) Studies in *Drosophila* speciation: I. The *Drosophila mulleri* group. *Genetics* 26(1): 146. 1941.—An abstract.

129. HUSKINS, C. L. (*McGill U.*) Polyploidy and mutations. (With discussion by H. E. WARMKE (*Carnegie Inst. Washington, Long Island.*)) *Amer. Nat.* 75(759): 329-346. 1941.—The survival rates of different types of mutations are very different in diploid and polyploid plants, diploid and haplo-diploid animals. The mutations of polyploids are believed to be largely chromosome aberrations. Various differences between polyploids and diploids are stressed. Recessive gene mutations have great difficulty in finding expression in polyploids, and gene changes that do not express themselves cannot be subject to positive or negative selection pressures. Polyploids, therefore, should not be of great importance in further evolution. Opposed to this point of view are the concepts (1) that gene mutations are not important in the larger aspects of evolution, and (2) that polyploidy may be of evolutionary importance in providing for the differentiation of new genes.—Authors.

130. GRIFFEN, A. B. (*U. Texas, Austin.*) Studies in *Drosophila* speciation: II. The *Drosophila melanica* group. *Genetics* 26(1): 154. 1941.—An abstract.

131. MCATEE, W. L. (*U. S. Dept. Interior.*) Thoughts on subspecies. *Sci. Month.* 53(4): 368-371. 1941.—The subspecies problem of the ornithologist is discussed. If the concept of differentiation areas could be developed, and a grid of these areas prepared that would show where recognizable variants of any wide-ranging and plastic spp. might be expected, the problem of what to recognize would be much simplified. This would also be of value in enlightening critics as to the inevitability of subspp. and as to the realities underlying subspecific nomenclature.—F. R. Hunter.

132. MAINLAND, GORDON B. (*U. Texas, Austin.*) Studies in *Drosophila* speciation. III. The *Drosophila macrospina* group. *Genetics* 26(1): 160-161. 1941.—An abstract.

133. MAYR, ERNST. Speciation phenomena in birds. *Amer. Nat.* 74(752): 249-278. 7 fig. 1940.—Birds are particularly suitable for a study of speciation phenomena because they are better known biologically and taxonomically than any other group of animals. A species is defined as consisting of a group of populations which replace each other geographically or ecologically and of which the neighboring ones intergrade or hybridize wherever they are in contact or which are potentially capable of doing so (with one or more of the populations) in those cases where contact is prevented by geographical or ecological barriers. Individual variation and the occurrence of exceedingly similar species obscure the taxonomic definition of spp. but actually they are very real natural units. Most species break up into well-defined geographical races of which the most isolated

ones often have all the morphological characters of good species. The occurrence of many border-line cases is strong evidence that new spp. originate generally through geogr. variation.—Ernest Mayr.

134. PATTERSON, J. T., WILSON S. STONE, and A. B. GRIFFEN. (*U. Texas, Austin.*) Studies in *Drosophila* speciation: IV. Extension of the *D. virilis* complex. *Genetics* 26(1): 164. 1941.—An abstract.

135. ROSENBLAD, L. E. (*U. Houston, Houston, Texas.*) Speciation studies on the basis of reproductive tract morphology in *Drosophilinae*. *Genetics* 26(1): 166. 1941.—An abstract.

136. SPENCER, WARREN P. (*Coll. Wooster.*) Ecological factors and *Drosophila* speciation. *Ohio Jour. Sci.* 41(3): 190-200. 1941.—The inherent difficulties in the formulation of a workable definition of species are reviewed. Speciation is considered to be based upon the occurrence of mutations and the mechanism of their subsequent distribution to, and fluctuations in frequency in the members of populations of finite size, accompanied by the development of isolating mechanisms. The population mechanics of *D. hydei*, a tropical species with a high incidence of infiltration into human population centers in the U. S. A., furnishes evidence for the probable effect of ecological factors on the population structure and potential evolution of native species. The rise and fall of *hydei* populations follows local fluctuations in temp., moisture, and food supply. A brief description of ecol. conditions under which various other *Drosophila* spp. are living indicates the important rôle which ecology plays in setting population patterns and providing a modus operandi for primary steps in evolution. Furthermore mutation rate may be directly conditioned by the repeated "shocks" to which all stages in the life cycle of *Drosophila* are subjected through sudden and extreme fluctuations in temp. and other environmental factors.—W. P. Spencer.

137. TIMOFÉEFF-RESOVSKY, N. W. (*Kaiser-Wilhelm Inst., Berlin-Buch.*) Zur Analyse des Polymorphismus bei *Adalia bipunctata* L. *Biol. Zentralbl.* 60(3/4): 130-137. 3 fig. 1940.—A polymorphic population of this common lady beetle in Berlin-Buch consisted of 7 different forms in which a dominant red (*typica*) and 2 recessive black forms (*4-maculata*, *6-pustulata*) were overwhelmingly predominant. For 5 yrs. during the 9-yr. period, 1930-38 (20-25 generations), an enumeration of the red and black individuals showed that after hibernation in early April the red form made up about 62.6% of the population and in late Oct. before hibernation about 41.3%. Commonly about 7% of the beetles survived hibernation but the relative vitality of the red was 2.5 times that of the black type. The polymorphism is maintained by a selection pressure which favors the red form in winter and the black in summer.—A. H. Hersh.

138. WHARTON, LINDA T. (*U. Texas, Austin.*) Studies in *Drosophila* speciation. VI. The *Drosophila repleta* group. *Genetics* 26(1): 174. 1941.—An abstract.

CYTOLOGY

Editors: R. E. CLELAND, *Plant*; C. E. McCLUNG, *Animal*

(See also Entries 6, 16, 17, 53, 129, 170, 173, 176, 177, 183, 191, 192, 193, 195, 197, 198, 200, 206, 209, 212, 213, 215, 216, 217, 218, 220, 221, 223, 226, 230, 254, 261, 282, 306, 987, 1052, 2214, 2282, 2323, 2335, 2421, 2424)

PLANT

139. CLAUSEN, ROY ELWOOD. (*U. California.*) Polyploidy in *Nicotiana*. (With discussion by HAROLD H.

SMITH (*U. S. Dept. Agric.*) *Amer. Nat.* 75(759): 291-309. 1941.—A general discussion of the findings of Dr. Clausen and his colleagues.

140. DOUTRELINE, JENNÝ. Les divers "types" de structure nucléaire et de mitose somatique. *Cellule* 48(2): 189-212, 3 pl. 1939.—The terminal meristem cells in young roots of 6 spp. of Bromeliaceae (*Bilbergia windii*, *Pitcairnea puberulenta*, *Vriesea splendens*, *Lindemannia penduliflora*, *Nidularium latifolium* and *Ananas microcephala*) and in *Coffea arabica*, *Gossypium herbaceum*, *Hordeum vulgare*, *Picea excelsa* and *Pinus sylvestris* were examined. In the resting nucleus the prochromosome represents the region of the future chromosome near its point of insertion. The fact that the prochromosome number is smaller than that of the chromosomes is due to the small size of the former which may be below the limits of visibility or to the failure of some prochromosomes to take the stain. In the first 6 spp. the chromosomes are straight; in *G. herbaceum* and *C. arabica* they are spirally twisted chromosomes or doli-chromemata. The *Gossypium* nucleus shows a well-marked polarity in the early prophase and late telophase. Similar cells of *Hordeum*, *Picea* and *Pinus* show networks instead of isolated prochromosomes in which certain chromatic granules grow into chromosomes, distinctly polarized in some spp. The changes in size of the nucleoli during mitosis are discussed.—*Hope Hibbard*.

141. FAGERLIND, FOLKE. (Stockholms Högskola.) Verschiedene Arten von Polyploidie. *Chron. Bot.* 6(11): 251-252, 1941.—Divides auto- and allo-polyploidy into further groupings which cannot be distinguished unless the polyploidy occurred under cultivation where one can be certain of all the factors of its ancestry.—*L. J. Gier*.

142. FRAHM-LELIVELD, J. A. Some remarks on the formation of the pollinia in *Gymnadenia conopea* (L.) R. Br. (orchid). *Naturwissenschaften*. *Tijdschr. Nederland-Indië* 101(8): 242-244, 1941.—*G. conopea*, gathered near Klosters (Switzerland), at an altitude over 1200 m., was investigated after fixation in Carnoy's soln. It appeared to have 20 chromosomes as its haploid number. This high number indicates tetraploidy, probably due to natural selection of the resistant tetraploid at the high altitude with less favorable climatic conditions. Later stages of pollinium formation are studied. Generative nuclei were found to be exclusively near the outer wall.—*J. C. Hoogerheide*.

143. GERASSIMOVA, HELEN. [A translocation between the B- and D-chromosomes and the trisomic effect of the B-chromosome in *Crepis tectorum* L.] [With Eng. summ.] *Izvestiya Akademii Nauk SSSR, Otdelenie Matematicheskikh i Estestvennykh Nauk, Seriya Biol. (Bull. Acad. Sci. URSS. Cl. Sci. Math. et Nat. Ser. Biol.)* 1940(1): 31-44, 12 fig. 1940.—X-raying of mature megametagametes of *C. tectorum* resulted in the production of a plant with reciprocally interchanged B- and D-chromosomes; the break occurred within the satellite of the D-chromosome and near the kinetic constriction of the B-chromosome. The translocant was self-sterile, but 69.9% fertile when open-pollinated. Progeny from the above individual included normal plants (*AABBCCDD*), plants with both translocated chromosomes (*AABB'CCDD'*), plants with 1 translocated chromosome (*AABBCDD'*)—trisomic for the distal part of the B-chromosome, but no plants with the other translocated chromosome (*AABB'CCDD'*)—doubtless because of the lethal effect of the complete loss of the distal part of the B-chromosome. One plant homozygous for both translocations (*AAB'B'CCDD'*) appeared, probably by self-fertilization. By nondisjunction individuals trisomic with regard to the proximal part of the B-chromosome (*BBB'DD*) as well as full trisomics (*BBB'DD'*) were produced. In the latter the material of the extra chromosome was divided between 2 chromosomes. Full trisomics and plants with only the distal part of the B-chromosome extra had the appearance of true B-trisomics. Plants with only the proximal part of the B-chromosome extra looked normal. Among the progeny of the translocant were plants different from both normals and trisomics: they arose from partial or complete loss of the "gigantic" satellite from certain meristematic cells of heterozygous translocants and trisomics.—*From auth. summ. by J. T. Baldwin, Jr.*

144. GERASSIMOVA, HELEN. [On the size of the satellites of the chromosomes.] [With Eng. summ.] *Izvestiya Akademii Nauk, SSSR, Otdelenie Matematicheskikh i Estestvennykh Nauk, Seriya Biol. (Bull. Acad. Sci. URSS. Cl. Sci. Math. et Nat. Ser. Biol.)* 1940(1): 45-55.

7 fig. 1940.—A chromosome with a "gigantic" satellite was formed as a translocation product of an X-rayed ♀ gamete of *Crepis tectorum*. The satellite was almost the entire distal limb of the B-chromosome translocated to the satellite thread of the D-chromosome. Root-tip studies of heterozygous and homozygous translocants showed the chromosomes with the "gigantic" satellite to be mitotically ineffective: breaks of the satellite thread occurred and the satellite (or parts of it) was extruded variously to form dwarf nuclei or chromatin globules; the cells often died. No mitotic disturbance was found in the upper parts of the plant. There the chromosomes were considerably shortened. Some sterility in the homozygous translocants and much in the heterozygotes indicate that the "gigantic" satellite may be lost at certain stages of reproduction, e.g., at early zygotic stages or at the time of spore germination when the chromosomes are attenuated.—*From auth. summ. by J. T. Baldwin, Jr.*

145. GIFFORD, ERNEST M. (U. California, Berkeley.) On the cyto-histology of the shoot apex of *Ephedra altissima* Desf. *Amer. Jour. Bot.* 28(8): 727, 1941.—An abstract.

146. GUARD, A. T., and C. H. HOBBS. Chromosome number in *Dracaena fragrans*. *Proc. Indiana Acad. Sci.* 50: 68, 1941.—A 12- to 15-yr.-old specimen produced nocturnal flowers in Feb. in the greenhouse. Flowering in this species is rare under greenhouse conditions. Chromosome counts were made from pollen mother cells, showing that $n=21$.—*Auth. summ.*

147. GUILLIERMOND, ALEXANDRE. (Sorbonne, Paris.) A new series of plant science books. Vol. 6. The cytoplasm of the plant cell. [With a foreword by WILLIAM SEIFRIZ. (U. Pennsylvania.)] 247p. 152 fig. *Chronica Botanica* Co.: Waltham, 1941. Pr. \$4.75.—This is the authorized translation into English by LENETTE ROGERS ATKINSON of an unpublished French manuscript. The first 5 chapters present a general summary of cell and protoplasmic structure from the morphological, physical, chemical and physico-chemical points of view. This part of the book serves as an introduction to the body of the work, which is chiefly concerned with the morph. constituents of the cytoplasm. Six chapters are devoted to the plastids and the chondriome, and five chapters deal with the vacuome. There is also a chapter on the Golgi apparatus and its possible homologue in plant cells, and one on lipid granules and other metabolic products. This is followed by a chapter devoted to the alterations brought about in cytoplasm by death, by physical agents and by parasites. A final chapter summarizes the author's point of view. The cytoplasm is an optically empty coacervate system rich in lipids. It contains in all plant cells a vacuolar system or vacuome and lipid granules. Chondriomes are present in all groups except bacteria and Cyanophyceae. Plastids are a special category of chondriomes and indistinguishable from these in their non-functional condition. The vacuoles are co-existent with the chondriomes and have no genetical relationship to them. Unlike the chondriomes and plastids, they arise de novo. Their formation is probably connected with secretory phenomena in the cell. The chemical, physical and morph. characteristics of these systems are considered in considerable detail. All of the various theories regarding them are fully reviewed as a preliminary to the development of the author's own points of view. The book contains a large bibliography. There is an author index and an index to plant and animal names, but no subject index.—*R. E. Cleland*.

148. INARIYAMA, S. Karyotype studies in Amaryllidaceae I. *Sci. Repts. Tokyo Bunrika Daigaku Sect. B* 3(52): 95-113. 4 pl., 3 fig. 1937.—In 39 spp. of 15 genera of Amaryllidaceae the diploid number of chromosomes varies from 12 to 150. In about 20 spp. the numbers are multiples of 11. Marked intergeneric variations in size and shape of chromosomes were noted. Karyotype resemblances indicate that the Amaryllidaceae and the Liliaceae are closely related. Polyploidy prevails in the Amaryllidaceae and a study of *Lycoris* shows that the basic chromosome number is 11. The V-shaped chromosomes are derived by the fusion of rods.—*W. L. Doyle*.

149. KOSTOFF, DONTCHO. Further studies upon the chromosome structure and behavior. *Cellule* 48(2): 177-187.

2 pl. 1939.—Studies of root tips of *Crepis capillaris*, pollen mother cells of *Triticum vulgare* and tapetum cells of several spp. of *Nicotiana*, suggest the following structure of chromosomes: They are not static, but vary depending on the mitotic stage. In the late metaphase a chromosome consists of 4 threads or chromonemata, 2 tightly twisted in each chromatid which are, in turn, loosely twisted. Each chromonema is composed of irregularly sized and spaced chromosomes separated by euchromatic material. Each chromosome represents a locus of condensation of nucleic acids. If large amts. of nucleic acid are accumulated they may appear very dark and extend along the chromonemata masking the interchromatic euchromatic regions.—*Hope Hibbard*.

150. LA COUR, L. (Johns Innes Hort. Inst., Merton, Lond., Eng.) Aceticorcein: a new stain-fixative for chromosomes. *Stain Technol.* 16(4): 169-174. 3 fig. 1941.—A new stain-fixative method for chromosomes, namely acetic-orcein, is descr., which gives results that are equally good in fresh and permanent preps. A 45% acetic and 1% orcein content is recommended as a standard soln. For salivary glands of *Drosophila* a 2% stain gives the best results, and with the 2 spp. *D. melanogaster* and *D. miranda* the acetic strength has been raised to 70% with advantage. Addition of chloroform proves necessary for hardening in spp. of *Sciara*. Acetic-orcein is equally good for rapid chromosome counts. For root tips, addition of 1 cc. of *N HCl* soln. to 10 cc. of the standard soln. together with gentle heating of the tissues in a drop of the mixture assists in the softening and separation of cells necessary for chromosome study. Orcein can also be used successfully in other combinations such as acetic-propionic or acetic-lactic. The latter is useful for making preps. that do not require ringing. Preps. so made keep 7-14 days.—*Auth. abst.*

151. MARSHAK, A. (U. California, Berkeley.) Chromosome abnormalities produced in interphase nuclei with x-rays and neutrons. *Genetics* 26(1): 161. 1941.—An abstract. Expts. with root tips of *Vicia faba*, *Pisum* and *Allium* are briefly reported.

152. MYERS, W. M., and HELEN D. HILL. (U. S. Regional Pasture Res. Lab., State Coll., Penna.) Variations in meiotic behavior among plants of the autotetraploid *Dactylis glomerata*. *Genetics* 26(1): 162. 1941.—An abstract.

153. NEWCOMER, EARL H. (Michigan State Coll.) An osmotic impregnation method for mitochondria in plant cells. *Stain Technol.* 15(3): 89-90. 1 fig. 1940.—Root tips are fixed in Zirkle's fixative. They are treated with 2% *OsO₄* for 4-6 days. Sections are bleached in 1% *KMnO₄* for 5 mins., then placed in 3% oxalic acid for 2-3 mins.—*C. G. Kadner*.

154. NORDENSKIÖLD, HEDDA. Cytological studies in triploid *Phleum*. *Bot. Notiser* 1941(1): 12-32. 28 fig. 1941.—Meiosis is described in haploid *P. pratense* ($2n=21$), triploid *P. nodosum* ($2n=21$), the triploid hybrid between *P. nodosum* ($2n=14$), and tetraploid *P. alpinum* ($2n=28$). The progeny from triploid *P. nodosum* and normal *P. pratense* ($2n=41$) was raised and studied structurally and cytologically. The possibility that *P. pratense* is an auto-polyploid of *P. nodosum* is discussed.—*G. Borgström*.

155. OEHLKERS, FRIEDRICH. Meiosis and crossing over. *Biol. Zentralbl.* 60(7/8): 337-348. 1940.—In this address an historical summary on the parallel between breeding data and cytological observations of meiosis is followed by a more detailed account of the data from *Oenothera* and *Antirrhinum* which show the correlation between chiasmata formation and diakinesis-terminalizations on the one hand and crossing-over on the other hand, as they are affected by external conditions, especially, by temp. and the water state of the plants.—*A. H. Hersh*.

156. PADDOCK, ELTON F. (U. California, Berkeley.) Natural and experimental polyploidy in *Solanum douglasii* Dunal and its relatives. *Amer. Jour. Bot.* 28(8): 727. 1941.—An abstract.

157. SPARROW, A. H., and G. B. WILSON. (McGill U., Montreal.) Relational coiling in the chromosome spiralization cycle of *Trillium erectum* L. and *T. grandiflorum* Salish. *Genetics* 25(1): 169-170. 1941.—An abstract.

158. SWANSON, CARL P. (Harvard U.) Inversions in pure species of *Tradescantia*. *Genetics* 26(1): 172. 1941.—An abstract.

159. SWANSON, CARL P. (Harvard U.) Major coiling and terminalization of chiasmata in *Tradescantia*. *Genetics* 26(1): 172-173. 1941.—An abstract.

160. THOMAS, P. T. (Johns Innes Hort. Inst., Merton Park, Lond., Eng.) The aceto-carmine method for fruit material. *Stain Technol.* 15(4): 167-172. 5 fig. 1940.—It is not easy to make good aceto-carmine preparations of plants with small chromosomes at meiosis because the cytoplasm readily takes up the stain and this prevents a sharp differentiation. The staining reaction depends on the composition of the pre-fixative, the duration of fixation, strength of aceto-carmine and amt. of iron used. These factors can be varied independently. Since not only species but their vars. differ markedly from one another in their behavior, the best results can be secured only after expt. with individual plants to discover the most suitable combination. Suitable combinations of these factors for some fruit plants are descr. In general they demand (1) a weaker soln. of aceto-carmine and more Fe than has hitherto been used in the aceto-carmine technic, and (2) the introduction of Fe and carmine into the pre-fixative. Fe acetate is added to a dilute soln. of carmine in glacial acetic acid until the soln. assumes a deep red color, without precipitation, and this soln. is used as the acetic acid component of an acetic-alcohol pre-fixative. Anthers are colored purple by treatment with this fixative, but since it has only a mordanting effect they need to be smeared and stained in the ordinary way.—*Auth. abst.*

161. WALTERS, JAMES L. (U. California, Berkeley.) The distribution of segmental interchange types in *Paeonia californica* and *P. brownii*. *Amer. Jour. Bot.* 28(8): 726-727. 1941.—An abstract.

162. WANG, YUN-CHANG, et P. MARTEENS. Sur l'origine de la dicaryophase chez quelques Urédinées. *Cellule* 48(2): 213-245. 81 fig. 1939.—In the 5 spp. studied, *Puccinia caricae*, *P. coronata*, *P. poarum*, *Uromyces poae* and *P. malvacearum*, no case of formation of the dikaryophase by union of 2 contiguous cells or by migration into a fertile cell of a nucleus from an adjacent cell was observed. In the hyphae below the fertile cells, between pycnidia and young aecidia, the majority of cells were mononucleate. There were in addition frequent binucleate cells, groups of conjugated mitoses, cells with 2 nuclei one of which was in division. The only sp. with apparently receptive hyphae was *P. malvacearum* which is lacking in pycnidia.—*Hope Hibbard*.

163. WARMKE, H. E. (Carnegie Inst., Cold Spring Harbor, N. Y.) A section-smear method for plant cytology. *Stain Technol.* 16(1): 9-12. 3 fig. 1941.—An improved method for making root-tip preps. of plants with medium or small chromosomes is descr. Division figures are oriented in polar view by cutting paraffin cross sections of roots; the pectic substance is removed from the middle lamellae and the sections then are smeared. The procedure recommended is as follows: Kill root tips in Navashin or other fluid containing chromic acid. Wash, dehydrate, embed in paraffin, and section transversely. Stain slides bearing the sections by a Feulgen technic following the modification of De Tomasi, except that the hydrolysis is prolonged to 45 min., and a 10-min. washing in running water is introduced between the fuchsin and the first bath in sulfite soln. Dehydrate and mount in thin Canada balsam; then apply local pressure to top of cover glass with the tip of a scalpel, while observing the action under low power of a microscope. The prolonged hydrolysis softens the tissue and removes sufficient pectic substance so that cells of the section separate readily and may be flattened until the chromosomes come to lie in a single plane. The slide is permanent.—*Auth. abst.*

164. WEIER, T. ELLIOT. (U. California, Davis.) Cytological studies on the carotene in the root of *Daucus carota*. *Amer. Jour. Bot.* 28(8): 726. 1941.—An abstract.

165. WILSON, G. B. (McGill U.), and ISABEL HUTCHESON (Nation. Res. Council). Further studies on changes of direction in the major coil of the chromonema of *Trillium erectum* L. *Canadian Jour. Res. Sect. C. Bot. Sci.* 19(10): 383-390. 1 pl. 1941.—A detailed study of the direction of chromonema coiling at 1st meiotic metaphase and anaphase has shown that reversals in direction of coiling occur in the attachment region, at chiasmata, and

in other regions. They occur with random frequency at the attachment. There is an average of 2 reversals at each "effective" chiasma. In other regions reversals were observed with a frequency of one in 17 gyres. There is no inherent pattern determining the direction of coiling; reversals are effected by various interrupting mechanisms.—Auth. abst.

ANIMAL

166. DOOLEY, THOMAS P. (Prairie View State Coll.) The influence of colchicine upon the germ cells of insects (Orthoptera) with special reference to the mitochondria and dictyosomes. *Trans. Amer. Microsc. Soc.* 60(1): 105-119, 30 fig. 1941.—Injn. of colchicine into the body cavities of crickets (*Gryllus assimilis*) and grasshoppers (*Melanoplus differentialis*) suppressed the meiotic as well as the mitotic divisions in the testes. The spermatogonia seemed to be more sensitive and degenerated more readily after treat-

ment than did spermatocytes. Suppression of the meiotic divisions often resulted in the formation of giant sperm cells with one or more tail filaments. Mitochondria were affected more markedly by colchicine than were the dictyosomes. The former appeared as short thickened rods or vesiculated granules; the latter were but slightly swollen. Recovered cells showed normal mitochondria and dictyosomes. Colchicine apparently prevents division but does not inhibit differentiation of sperm cells.—T. P. Dooley.

167. KAUFMANN, B. P. (Carnegie Inst., Cold Spring Harbor, N. Y.) Evidence of delay in reattachment of chromosome fragments following X-radiation of sperm of *Drosophila melanogaster*. *Genetics* 26(1): 157. 1941.—An abstract.

168. PAINTER, T. S. (U. Texas.) The effects of an alkaline solution (pH_{13}) on salivary gland chromosomes. *Genetics* 26(1): 163-164. 1941.—An abstract.

GENETICS

Editors: ORLAND E. WHITE, *Plant*; SEWALL WRIGHT, *Animal*

(See also Entries 53, 60, 128, 129, 130, 132, 134, 135, 137, 139, 141, 143, 148, 151, 152, 154, 156, 158, 159, 166, 314, 316, 323, 331, 332, 755, 1075, 1093, 1284, 1297, 1316, 1337, 1342, 1343, 1344, 1362, 1384, 1386, 1387, 1409, 1427, 1446, 1453, 1473, 1474, 1483, 1546, 1650, 1724, 1843, 1887, 1977, 2176, 2178, 2335, 2436, 2446, 2451, 2489, 2493, 2495, 2503, 2516, 2590, 2603, 2609, 2610, 2627, 2632, 2634, 2635, 2656, 2702, 2756, 2767, 2790, 2795, 2797, 2858, 2901, 2911, 2924, 2938, 2961, 3036, 3109, 3254, 3306, 3316, 3318, 3340, 3422)

GENERAL

169. NABOURS, ROBERT K. (Kansas Agric. Expt. Station, Manhattan.) More or less lethal genes. *Genetics* 26(1): 162-163. 1941.—An abstract.

170. STUBBE, H. (Kaiser-Wilhelm Inst., Berlin-Dahlem.) Neue Forschungen zur experimentellen Erzeugung von Mutationen. *Biol. Zentralbl.* 60(3/4): 113-129. 1940.—The intensive work on the production of mutations by X-rays along with the cytological observations on the larval salivary-gland chromosomes of *Drosophila* and on the prophases in *Zea mays* has led to a crisis in the conception of gene mutation. Mendelian mutations that segregate monofactorially include translocations, inversions, deficiencies, and also a group which show neither structural changes nor crossing-over derangements. These last may be genuine gene mutations or small structural rearrangements below the limits of microscopic visibility, but for any particular case it is impossible to decide with present methods of investigation. When eosin is present as a sensitizer visible light increases the mutation rate 6-fold in *Neurospora crassa*. In *Antirrhinum majus* the mutation frequency for leaf and flower form and leaf and flower color is increased if the nutrient medium is deficient in N or P or S. P-deficient pollen is smaller than normal. When both are subjected to X-rays (6000r) the mutation frequency is significantly increased in the P-deficient pollen. Among a number of chemical substances tested, phenol, K rhodanide and chloral hydrate were found to produce a clear increase of the mutation frequency in *A. majus*. Analysis of mutation frequencies in *A. majus graminifolia* and *perlutea* indicates that in the former each mutant represents a separate mutation so that the mutation occurs late in the germ track, while in *perlutea* mutations occurred earlier than the gonia. Virus and gene are compared.—A. H. Hersh.

171. WRIGHT, SEWALL. (U. Chicago.) The physiology of the gene. *Physiol. Rev.* 21(3): 487-527. 10 fig. 1941.—The material is discussed under the following heads: the gene as a unit of heredity; the gene as a physical entity; gene duplication; control of genes by cellular physiology; non-mendelian heredity; the genetics of individual and species specificity; the relation of genes to growth; heredity in relation to differentiation; genic control of enzyme differences; gene control of chain reactions; theories of dominance and factor interaction; morphogenesis.—Margaret Sumwalt.

172. ANONYMOUS. Russian contributions to the 1939 Genetics Congress. *Jour. Heredity* 32(8): 248. 1941.—The Genetic crisis in Russia prevented the attendance of any Russian delegates at the Internat. Congress at Edinburgh in Aug. 1939. Because the papers were not presented by their authors they are not included in the Proceedings of

the congress. The papers on *Drosophila* are being issued by the Drosophila Information Service as *D. I. S. 15*. The American Documentation Institute is affording the other papers supplemental publication as microfilm and photoprints. Some are in summary only. These are designated in the table of contents which is given. A total of 21 titles is divided as follows: A. Plant Genetics (A.D.I. Document 1563) 11; B. Human Genetics (A.D.I. Document 1564) 3; C. Animal Genetics (A.D.I. Document 1565) 7; Orders for these documents should be sent to the American Documentation Institute, 2101 Constitution Ave., Washington, D. C., U. S. A. Prices of both microfilm and photoprints are given and orders must include remittance as well as the document number of the publication desired.—L. M. Dickerson.

PLANT

173. ATWOOD, SANFORD S. (U. S. Regional Pasture Res. Lab., State Coll., Penna.) Cytogenetic basis of self-compatibility in *Trifolium repens*. *Genetics* 26(1): 137. 1941.—An abstract.

174. AYYANGAR, G. N. RANGASWAMI, and K. KUNHI KRISHNAN NAMBIAR. (Millets Breeding Sta., Coimbatore, India.) Tricotyledony in lablab. *Current Sci.* 10(5): 255-256. 1941.—A tricotyledonous seedling of *Dolichos lablab* was found to have 3 foliar leaves for each cotyledon. The specimen was grown; of 499 of its seeds examined, 10 were found to be tricotyledonous as well as having 3 simple first foliar leaves.—R. A. Muttkowski.

175. AYYANGAR, G. N. RANGASWAMI, and K. KUNHI KRISHNAN NAMBIAR. (Millets Breeding Sta., Coimbatore, India.) Albinism in lablab. *Current Sci.* 10(5): 255. 1 fig. 1941.—A field var. of *Dolichos lablab* showed albinos in the *F*₂, the plants dying in 12 days. From the remaining green plants, 8 bred true, 12 segregated into green and albino.—R. A. Muttkowski.

176. BADENHUIZEN, N. P. Experimentally produced haploids in *Nicotiana tabacum* by means of X-rays. *Naturwetenschap. Tijdschr. Nederland.-Indië* 101(8): 240-242. 1941.—Pistils of *N. tabacum* were fertilized with X-ray treated pollen (5000 r) of a dwarf mutant. Higher X-ray dosage led to formation of a majority of non-germinating seeds. Many aberrant types were obtained, often due to structural changes in the chromosomes of the pollen mother cells. 7 haploids were found with a somatic chromosome number of 24, all scattered over the entire spindle. Haploids have smaller flowers than diploids, but otherwise resemble them closely. Attempts to double their chromosome number by means of colchicine are under way.—J. C. Hoogerheide.

177. BALDWIN, J. T. Jr. (U. Michigan.) Galax: the

genus and its chromosomes. *Jour. Heredity* 32(8): 249-254. Map, 1 fig. 1941.—*Galax aphylla* is unspecific but has 2 chromosome races: diploid ($n=6$, $2n=12$) and tetraploid ($n=12$, $2n=24$). The diploid grows throughout the range, which is shown by maps, except in the Virginia coastal plain where only the tetraploid has been found. The discontinuous occurrence of the 2 races outside the main area of the species adds to the evidence that *G. aphylla* went from the old Appalachian upland into the geologically younger regions. Most of the chromosome counts were made from leaf and stem-tip smears and among several hundred plants from 117 stations distributed throughout the species range but 1 atypical cell with 48 somatic chromosomes was found. The tetraploid is potentially larger than the diploid but under unfavorable growing conditions actually is often smaller. The commercial *Galax* area corresponds pretty well with the region where the tetraploid is concentrated and where conditions for vigorous growth seem optimum. Cold shock during a glacial period and heat effect during a forest fire are suggested as possible agents in inducing polyploidy.—Auth. summ.

178. BAMFORD, RONALD, and FRED B. WINKLER. (U. Maryland.) A spontaneous tetraploid snapdragon. *Jour. Heredity* 32(8): 278. Frontispiece. 1941.—Two vars. of snapdragon (*Antirrhinum majus*), Coates Yellow Perfection and Yellow Cheviot Maid, were hybridized and in the F_1 population, 2 distinctly larger plants appeared from the 800 seeds planted. Both were tetraploids and had 32 chromosomes. The stems, inflorescences, leaves, flowers, pollen grains and stomata were larger than the corresponding diploid.—Ronald Bamford.

179. BARROWS, FLORENCE L. Inheritance in *Cucurbita* pollen. *Genetics* 26(1): 137. 1941.—An abstract.

180. BAWDEN, F. C. (Rothamsted Exp. Sta.) Problems in breeding for disease resistance. *Chron. Bot.* 6(11): 247. 1941.—A discussion of Reddick's question (What profiteth it a man to gain a blightproof potato only to lose it with the submicroscopic virus "X"?) which he answers with "Quite a lot." Development of a very susceptible var. may lead to extermination of the parasite, a resistant var. to elimination of the parasite and a tolerant one may serve as a source of infection for its neighbors.—L. J. Gier.

181. BERGER, C. A. (Fordham U., New York.) A new criterion of the degree of polyploidy of "resting" nuclei. *Genetics* 26(1): 137-138. 1941.—An abstract.

182. BERGNER, A. D., A. F. BLAKESLEE, and A. G. AVERY. (Carnegie Inst. of Washington, Cold Spring Harbor, N. Y.) Distribution of prime types in nine species of *Datura*. *Genetics* 26(1): 138. 1941.—An abstract.

183. BLAKESLEE, A. F., and A. G. AVERY. (Carnegie Inst. Washington, Cold Spring Harbor, N. Y.) Classification and location of genes in *Datura*. *Genetics* 26(1): 138-139. 1941.—An abstract.

184. BOOTHROYD, E. ROGER. (McGill U., Montreal.) The interlocking of non-homologous bivalents in *Trillium erectum* L. *Genetics* 26(1): 140. 1941.—An abstract.

185. BOWDEN, WRAY M. (U. Virginia, Boyce, Va.) Chromosome studies in tropical, subtropical, and temperate zone plants with reference to polyploidy and winter hardiness. *Genetics* 26(1): 140-141. 1941.—An abstract.

186. BRITTINGHAM, WILLIAM H. (U. Maryland, College Park, Md.) An artificially produced hybrid between *Poa compressa* L. and *P. pratensis* L. *Genetics* 26(1): 141-142. 1941.—An abstract.

187. BUCHHOLZ, J. T., and A. G. BLAKESLEE. (U. Illinois, Urbana, Ill.) Pollen-tube growth in intra- and interspecific pollinations between balanced polyploids of *Datura*. *Genetics* 26(1): 142-143. 1941.—An abstract.

188. BURNHAM, C. R. (U. Minnesota, St. Paul.) Cytogenetic studies of an interchange between chromosomes 1 and 7 in maize. *Genetics* 26(1): 143. 1941.—An abstract.

189. CLAUSEN, ROY E. (U. California, Berkeley.) Monosomic analysis in *Nicotiana tabacum*. *Genetics* 26(1): 145. 1941.—An abstract.

190. COFFMAN, F. A., H. B. HUMPHREY, and H. C. MURPHY. (U. S. Dept. Agric.) New red oats for fall seeding resistant to rusts and smuts. *Jour. Amer. Soc. Agron.* 33(10): 872-882. 1 fig. 1941.—Extensive attempts to breed oats resistant to crown rust (*Puccinia coronata*) for fall seeding in the southern states met with little success

until the discovery of unusual resistance in the Victoria and Bond vars. Victoria also is resistant to the races of smut occurring in the winter oat belt. When crown rust resistant strains from crosses of Victoria with Nortex and Fulghum and other crown rust-resistant oats were destroyed by stem rust (*P. graminis avenae*), the hitherto unrecognized importance in the South of resistance to the latter disease also became evident. Stem- and crown rust-resistant strains from a Victoria-Richland hybrid were then crossed with vars. of winter oats. The first crosses reported herein were Victoria \times Nortex and Victoria \times Fulghum. Thousands of selections from these crosses have been tested for winter-hardiness, yield, and other agronomic characters and for resistance to crown rust and smut in the greenhouses at Arlington, Va., and Ames, Iowa, and in the field at cooperating stations throughout the southern U. S. Some of these selections are extremely promising, and 3 of them, Ranger, Rustler, and Fultex, have been named and distributed to farmers. These are resistant to crown rust and smut but not to stem rust. Fultex appears especially winterhardy for a red oat. In other crosses involving Richland, Victoria, and Red Rustproof, the stem rust resistance of Richland, the crown rust and smut resistance of Victoria, and the winterhardiness and other desirable characteristics of Red Rustproof have been combined in several selections. Also, preliminary observations indicate that certain segregates of other crosses involving Victoria and Richland and either Fultex or other Fulghum \times Markton selections may prove suitable for fall seeding in the deep South.—Auth. summ.

191. DERMEN, HAIG. (U. S. Hort. Station, Beltsville, Md.) Periclinal and total polyploidy in peaches induced by colchicine. *Genetics* 26(1): 147. 1941.—An abstract.

192. DERMEN, HAIG, and HENRY F. BAIN. (U. S. Hort. Station, Beltsville, Md.) Periclinal and total polyploidy in cranberries induced by colchicine. *Genetics* 26(1): 147-148. 1941.—An abstract.

193. EIGSTI, O. J. (U. Oklahoma, Norman.) Chromosomal studies of diploid and related polyploid species from pollen tubes treated with colchicine. *Genetics* 26(1): 149. 1941.—An abstract.

194. EINSET, JOHN. (Cornell U., Ithaca.) Characteristics of parthenogenetic diploids derived from tetraploid maize. *Genetics* 26(1): 150. 1941.—An abstract.

195. EMSWELLER, S. L. (U. S. Dept. Agric.), and M. L. RUTTLE (N. Y. State Agric. Exp. Sta., Geneva). Induced polyploidy in floriculture. [With discussion by H. E. WHITE (Mass. State Coll., Waltham).] *J. Amer. Nat.* 75(759): 310-328. 1941.—Some of the possibilities of utilizing colchicine-induced polyploidy in ornamental plants are discussed. The tetraploid ornamentals produced at the U. S. Hort. Station, Beltsville, Md., and the N. Y. Agric. Expt. Station at Geneva, N. Y., are descr. and their fertility discussed. The fertility secured in the hybrid when 2 sterile auto-tetraploid *Antirrhinum* vars. were crossed suggests an amphidiploid behavior. In several of the mutant forms obtained from treated plants, the chromosome number was unchanged. It is suggested that the production of certain aneuploids from treated plants indicates a possible origin for new vars. of flowers, since certain vars. of iris are already known to be aneuploids.—S. L. Emsweller.

196. FISCHER, H. E. (Cornell U.) Causes of sterility in autotetraploid maize. *Genetics* 26(1): 151. 1941.—An abstract.

197. GILES, NORMAN. (Harvard U.) Spontaneous chromosome aberrations in triploid *Tradescantia* hybrids. *Genetics* 26(1): 152. 1941.—An abstract.

198. GRANER, E. A. (Univ. São Paulo.) Polyploid cassava induced by colchicine treatment. *Jour. Heredity* 32(8): 281-288. 6 fig. 1941.—After a brief discussion on the present cytogenetical position of the plant, the author describes in detail the methods used in obtaining polyploid cassava by colchicine treatment. Tetraploids and one octoploid plant, besides another very altered plant of unknown chromosome constitution were obtained and a comparison between the $4n$ plant and the controls was made, the other plants being slow in development. Illustrations of the plants, leaves, stomata, flowers, pollen and chromosomes, both of control and altered plants are given. The characteristics of the roots, the part of economic value of the plant, could not be studied, since the treatment

produced only a type of chimera with a subterranean diploid base and an aerial tetraploid part. Complete tetraploid individuals can be obtained only in the 2d vegetative cycle of the treated plant and their root production can be analyzed after about another year.—Auth. abst.

199. GREENLEAF, WALTER. (U. California.) Genic sterility in tabacum-like amphidiploids of *Nicotiana*. *Amer. Jour. Bot.* 28(8): 726. 1941.—An abstract.

200. GREENLEAF, WALTER H. (U. California.) Sterile amphidiploids: their possible relation to the origin of *Nicotiana tabacum*. *Amer. Nat.* 75(759): 394-399. 1941.—The amphidiploids, *N. sylvestris-tomentosa*, *N. sylvestris-tomentosiformis*, *N. tomentosiformis-sylvestris*, *N. sylvestris-setchellii*, and *N. glutinosa-tomentosa*, were obtained from callus of the corresponding F_1 hybrids. All but the last mentioned resemble *N. tabacum*, and are possible ancestral types of the latter. All of the amphidiploids cited are ♀-sterile but ♂-fertile. Extensive cytological studies of ovaries of *N. sylvestris-tomentosa* (4n), *N. sylvestris-tomentosiformis* (4n), and *N. tomentosiformis-sylvestris* (4n) have shown that meiosis and megasporogenesis in them are quite regular, but that embryo-sac development does not proceed beyond the 2- or 4-nucleate stage when disintegration occurs. Their pollen is over 90% good. *N. glutinosa-tomentosa* (4n) behaves very similarly to the above, except that meiosis is less regular. *N. sylvestris-setchellii* (4n) shows some 8-nucleate embryo sacs. F_1 hybrids of *N. tabacum* with some of the above amphidiploids are only partially fertile. Ovule abortion in them is similar to that in the ♀-sterile amphidiploids. The fertile amphidiploid *N. sylvestris-tomentosiformis* Kostoff is not structurally amphidiploid. Its fertility is ascribed to changes in the chromosomes coincident with the loss of genes causing abortion of the embryo-sacs. These changes are probably due to the method of synthesis, and are avoided when the amphidiploid is made by the callus method.—Walter Greenleaf.

201. HOFMEYER, J. D. J. (Subtrop. Hort. Res. Sta., Nelspruit, Union S. Africa.) The genetics of *Carica papaya*. *Chron. Bot.* 6(11): 245-247. 1941.—Genetic and environmental factors induce sex changes in the flowers borne on the 3 (polygamous) sex forms of papaya. The 2X chromosome number is 18 with no heteromorphic pairs being found. The ratio of crosses between sex forms and of crossover of sexlinked characters is given and the genetic balance hypothesis of sex determination is discussed. "There is no difference in vigor between ♀♀ and ♂♂, which discredits the popular belief that the ♂ is usually more vigorous than the ♀."—L. J. Gier.

202. HOLUBINSKY, I. N. [New experimental tetraploid specimen of *Ocimum canum* Sims.] *Botanicheskii Zhurnal SSSR (Jour. Bot. USSR)* 24(2): 104-107. 1939.—Plants of *O. canum* were obtained by means of regeneration, using author's method described in his previous paper. Out of 7 plants studied cytologically one was found to be tetraploid with greater hirsuteness, a more finely and closely serrated leaf blade, and a stronger odor of camphor. Since tetraploid specimens can be easily obtained in *O. canum*, it might be possible to use this method of obtaining plants with more desirable economic characteristics (e.g., higher camphor content).—G. Kroikov.

203. HORNER, W. H., and W. J. WHITE. (Dominion Forage Crops Lab., Saskatoon, Sask.) Investigations concerning the coumarin content of sweet clover. III. The inheritance of the low coumarin character. *Sci. Agric. [Ottawa]* 22(2): 85-92. 1941.—The coumarin content of the F_1 to F_2 of crosses between low \times high coumarin vars. of *Melilotus alba* was investigated. From the F_1 it was shown that high coumarin content was dominant. Classifying plants testing 0 to 0.05% as low and those above 0.1% as high, the segregation of 1210 F_2 plants gave a good fit to 3:1 ratio. Low-coumarin F_2 plants yielded pure-breeding, low-coumarin progenies. Of the progenies of 31 high-testing F_2 plants, 22 were segregating and 9 were true-breeding for the high coumarin character. No linkage was observed between coumarin content and the Alpha habit of growth or white sepals.—W. J. White.

204. JONES, D. F., and W. R. SINGLETON. The improvement of naturally cross-pollinated plants by selection of self-fertilized lines. III. Investigations with vegetatively propagated fruits. *Connecticut State Agric. Exp. Sta. Bull.*

435. 325-347. 11 fig. 1940.—The authors discuss the theoretical aspects of inbreeding of heterozygous plants with a view to eliminating undesirable and intensifying desirable characters in the progeny and report on expts. with strawberries and raspberries. In the work with strawberries involving 5 vars., Howard 17, Chesapeake, Glen Mary, Marshall, and Progressive, inbreeding resulted in a reduction in size, viability, and reproductive capacity. Many of the inbreds were lost during the winter. Abnormalities, such as the alteration of the flower bud into a proliferating mass of small leaves and defections in chlorophyll, were observed in some seedlings. The possible nature of the yellowing of strawberry foliage is discussed. Crossing of inbred lines restored vigor and size to full measure, and certain combinations of three or 4 inbreds were sufficiently promising to be named (Shelton and Hebron). In raspberry breeding, Ranere, Columbian, and Cumberland were selfed from 1 to 3 yr. Ranere and Columbian seedlings showed marked reduction in growth. Cumberland black yielded selfed seedlings which retained full vigor and production through 3 generations of selfing. All 3 raspberries showed considerable segregation upon selfing. Since raspberry seedlings start free of mosaic, the technic may have promise for the development of true-breeding black raspberries as a nursery practice. Promising red-fruited raspberries were produced from hybrids of black and red raspberries back-crossed to reds. However, many of these produced neither root sprouts nor tip layers, limiting their increase. Hybrids from raspberry \times blackberry were more thorny than the parents and produced less fruit.—Courtesy *Exp. Sta. Rec.*

205. KRANTZ, F. A., and CARL J. EIDE. (Minnesota Agric. Exp. Sta.) Inheritance of reaction to common scab in the potato. *Jour. Agric. Res.* 63(4): 219-231. 1941.—Starting with the assumption that the type of inheritance in the potato was autotetrasomic and that the difference observed in reaction to common scab was principally due to the influence of 1 gene, the segregates obtained from the F_1 , F_2 , and F_3 generations of a cross between Accession 123 and Lookout Mountain were classified into 5 breeding types. The separation was made in regions where the mean scab reaction of the sexual progenies showed the greatest discontinuity. The distribution of the segregates of the 5 breeding types in the F_1 , F_2 , and F_3 generation approached that calculated on the hypothesis that Accession 123 was triplex and Lookout Mountain was simplex for a gene *Sc* influencing reaction to scab and that the 5 breeding types corresponded to the genotypes *Sc*₄, *Sc*₃*sc*, *Sc*₂*sc*₂, *Sc*₂*sc*, and *sc*₄. 118 vars. and selections of heterogeneous origin were classified from sexual progeny tests into 5 groups corresponding to the above breeding types as follows: (1) the var. Hindenburg; (2) 7 selections and the var. Jubel; (3) 42 selections; (4) 31 selections and the var. Earlaine; and (5) 34 selections and the Chippewa var. Hindenburg, which was classified in type 1, gave a progeny from which 2 segregates were isolated whose sexual progeny gave a significantly higher mean scab reaction than the progeny of Hindenburg. Crosses between types gave progenies whose mean reaction to scab was in general agreement with the reaction of the selfed progenies of the parents. The Early Ohio, Triumph, and Warba, were classified in type 5, from the mean scab reaction of the crossed progenies, obtained when these vars. were used as female parents. An association between the color factor *P* and the mean scab reaction was observed in a study of 13 crosses. The mean scab reaction of the *P* and *p* plants for the 13 crosses was 2.49 and 1.99 respectively.—Auth. summ.

206. LAMM, ROBERT. Varying cytological behavior in reciprocal *Solanum* crosses. *Hereditas* 27: 202-208. 1941.—Pentaploid *S. curtilobum* ($2n=60$) \times tetraploid *S. tuberosum* ($2n=48$) gave fertile hybrids with intermediate chromosome numbers. The reciprocal cross only succeeded when the mother plant was grafted on the tomato. The resulting hybrids which had an intermediate chromosome number were completely sterile. Meiosis in P.M.C. of *S. curtilobum* \times *S. tuberosum* proceeded normally as in the parents. Meiosis in the reciprocal hybrid was characterized by weak pairing during prophase and only univalents during metaphase which often arranged themselves in a regular plate, divided, and passed to the poles giving rise to dyads, the nuclei of which usually degenerated. In the E.M.C.

of either cross, meiosis was usually normal and gemini invariably formed.—*F. N. Briggs.*

207. LAMPRECHT, HERBERT. Die Artgrenze zwischen *Phaseolus vulgaris* L. und *multiflorus* Lam. [With Eng. summ.] *Hereditas* 27: 51-175. 1941.—The author studied a number of crosses between *P. vulgaris* \times *P. multiflorus* which succeeded only when *vulgaris* was used as the ♀. *P. vulgaris* is normally self-fertilized and highly homozygous; *P. multiflorus* is cross-fertilized and correspondingly heterozygous. The success of the crosses depended on the parent strains, some combinations giving 2-3 germinable seed per pollination, while others were a complete failure. The F_1 plants were intermediate in position of cotyledons, the stigma, color of flowers and seed size, but the inflorescence and the pods resembled *multiflorus*. F_1 populations consisted of (a) all large plants (b) large and dwarf in the proportion of 1:1 or (c) large and dwarf in the ratio of 3:1. F_1 plants were highly sterile, with the dwarfs producing no viable seed. The F_1 pollen was 65-85% empty, which only accounted for a part of the sterility. Meiosis in F_1 ran a normal course, but after telophase II a great many of the pollen grains degenerated. While the F_1 resembled *multiflorus* in a number of characters, these characters had largely disappeared in F_2 , thus no gene analysis was possible in that generation. However, by means of extensive studies in F_2 - F_3 , the inheritance of a number of characters was established. The position of the cotyledons is due to 2 genes, *Hyp* and *Epi*, and the shape by *Ext* and *Int*. Flower color segregation was highly complicated. Three shades of red were established which were interpreted as being due to multiple alleles. The 2 spp. were thought to differ in 8 genes with reference to flower colors. There appeared to be at least 2 genes for different direction of the inflorescence, 2 for internodes length, and 2 for the number of internodes in the inflorescence. The shape, size, and hairiness of the leaves showed transgressive segregation. The dominant mutation *Sur* with decinate leaves appeared several times. Completely sterile and more or less narrow-leaf plants of the *angustifolia* type appeared in the majority of the crosses which sometimes appeared to segregate as a monohybrid. This type was explained as due to a deficiency. The direction of stem branching was attributed to 2 genes, and the number of internodes to 3. The segregation of seed size was complicated. The *circumdatus* design of certain *P. multiflorus* seeds was recessive to striation *R_{st}* and marbling *R_{ma}* in *P. vulgaris*. The high sterility in F_1 was attributed to gene-plasm relationship. A change in the plasm appeared to be necessary to permit the inclusion of *multiflorus* characters into hybrids. In later generations fertile lines representing combinations between the characters of both spp. were selected. These were designated as *P. multigaris*. Lines similar to *vulgaris* or *multiflorus*, but giving more or less sterile hybrids when crossed with them, were called *neovulgaris* and *neomultiflorus*, respectively. The F_1 of *P. vulgaris* \times *P. multigaris* and *P. multigaris* \times *P. multigaris* were homogenous but showed great diversity among themselves. The following cases were noted: (1) the seeds were not viable, (2) F_1 plants, normal in appearance, died after 4-5 weeks, (3) all were sterile dwarfs, (4) all were weak semi-dwarfs, (5) all were semi-tall, and finally (6) all were normal. Empty pollen varied from 0-92%. In F_2 and later generations these crosses showed simple to complicated segregation. The self-sterility genes *S₁*, *S₂*, *S₃*, etc., found in *multiflorus*, are sufficient to account for conditions found in various crosses. The high gamete sterility in F_1 and the great loss of *multiflorus* characters in F_2 were explained on the basis of the great gene differences, most new combinations of which were not viable in the existing plasm. However, the boundaries of the 2 spp. were bridged by *multigaris* which should make possible a more complete analysis of the species differences. On the basis of data thus far obtained, the gene difference is estimated at little more than 100. The incompatibility of certain new gene combinations with the existing plasm is discussed with respect to evolution.—*F. N. Briggs.*

208. LESLEY, J. W., and MARGARET MANN LESLEY. (U. California Citrus Exp. Sta., Riverside, Calif.) An hereditary variegation in tomatoes associated with sterility. *Amer. Jour. Bot.* 28(8): 727. 1941.—An abstract.

209. LESLEY, MARGARET MANN, and J. W. LESLEY. (*Citrus Exp. Station, Riverside, Calif.*) Parthenocarpy in a deficient tomato plant and in its aneuploid progeny. *Genetics* 26(1): 159-160. 1941.—An abstract.

210. MACVICAR, R. M., and H. R. PARNELL. (*Exp. Farms Ser., Ottawa, Ontario.*) The inheritance of plant colour and the extent of natural crossing in foxtail millet. *Sci. Agric. [Ottawa]* 22(2): 80-84. 1941.—Evidence is presented that purple pigment (in *Setaria italica*) represented by a single main factor is dominant over green, and that inheritance is monogenic. An av. of 0.689% natural crossing was found by testing the progenies of 64 pure green lines exposed to purple pollen. A range of natural crossing from 0 to 9.86% was established.—*Auth. summ.*

211. MOEWIS, FRANZ. Über Mutationen der Sexual-Gene bei Chlamydomonas. *Biol. Zentralbl.* 60(11/12): 597-626. 1940.—Temp. shock (15 min. at 75°C) produced a mutation rate of the order of 0.3% for several genes. The frequency produced by X-rays (6000 r) was of the order of 0.002%. This is a preliminary report which includes a summary and a discussion of much previous work on these algae.—*A. H. Hersh.*

212. MÜNTZING, ARNE. New material and cross combinations in *Galeopsis* after colchicine-induced chromosome doubling. *Hereditas* 27: 193-201. 1941.—Four *Galeopsis* spp. *pubescens* ($2n=16$), *speciosa* ($2n=16$), *tetrahit* ($2n=32$) and *bifida* ($2n=32$) were treated with colchicine, which resulted in the formation of a number of autotetraploids. Tetraploids from the normal diploid spp. *pubescens* and *speciosa* exhibited increased size and somewhat reduced fertility. In the case of *tetrahit* and *bifida* which are normal tetraploids, the doubling of the chromosome number resulted in high sterility, abnormal flowers and reduced vigor, indicating that the optimal chromosome number had been surpassed. Previous investigations have shown that crosses between normal 16 and 32 chromosome species always fail, whereas crosses of 16×16 and 32×32 are more or less fertile. The autotetraploid *pubescens* and *speciosa* were completely incompatible with their original diploid spp. However, autotetraploid *pubescens* and *speciosa* succeeded in crosses with normal *tetrahit*, indicating, the author believes, that results are predominantly controlled by quantitative conditions. The F_1 from tetraploid *speciosa* \times *tetrahit* exhibited normal viability and partial fertility. Amphi-diploids of *pubescens-speciosa* species have been produced from crosses of autotetraploid lines of these species as well as by doubling the F_1 from a cross of the diploid strains.—*F. N. Briggs.*

213. MURRAY, MERRITT J. (Cornell U., Ithaca, N. Y.) The breeding behavior of a tetraploid race of a dioecious species. *Genetics* 26(1): 162. 1941.—An abstract. *Acrida tamariscina*.

214. MYERS, W. M. (U. S. Regional Pasture Res. Lab. State College, Pa.) Genetical consequences of the chromosomal behavior in orchard grass, *Dactylis glomerata* L. *Jour. Amer. Soc. Agron.* 33(10): 893-900. 1941.—Inheritance of yellow and albino seedlings was studied in the I_1 (1st inbred) and I_2 (2d inbred) generations of plants of orchard grass known to be heterozygous for factors conditioning these characters. The results were consistent with the hypothesis of tetrasomic inheritance. Crossing-over between the gene and the centromere was demonstrated by the occurrence of simplex I_1 plants among the progenies of triple parents.—*W. M. Myers.*

215. NEBEL, B. R. (editor), et al. Symposium on theoretical and practical aspects of polyploidy in crop plants. *Amer. Nat.* 75(750): 289-365. 1941.—Comprises the following papers, all abstracted separately. Introduction, by B. R. NEBEL; Polyploidy in *Nicotiana*, by ROY ELWOOD CLAUSEN (with discussion by HAROLD H. SMITH); Induced polyploidy in floriculture, by S. L. EMSWELLER and M. L. RUTTLE (with discussion by H. E. WHITE); Polyploidy and mutations, by C. L. HUSKINS (with discussion by H. E. WARMKE); An evaluation of induced polyploidy as a method of breeding crop plants, by L. F. RANDOLPH (with discussion by GEORGE M. DARROW).

216. NILSSON, FREDRIK. The hybrid *Festuca arundinacea* \times *F. pratensis* and some of its derivatives. *Bot. Notiser* 1940(1): 33-50. 4 fig. 1940.—The hybrid *F. arundi-*

nacea \times *F. pratensis* is not absolutely sterile: after open pollination some seeds were harvested, and although the germination was poor, 39 seedlings developed in 1 yr. Most of the hybrid plants are highly sterile, as the *F*₁ hybrids, but on the average their fertility is much higher and some of the individuals set many viable seeds. The progeny plants differ very much in morphological respects; types resembling one of the parents, more or less intermediate types and new combinations being obtained. In the *F*₁ hybrids, $2n=28$. The meiotic divisions are irregular. Mostly 7 bivalents and 14 univalents occur; trivalents and quadrivalents were seen occasionally. In the sporogenous tissue wall formation often fails, giving rise to multinucleate pollen mother cells. Through syndiploid metaphases and failure of reduction, unreduced and polyploid gametes are produced. The progeny individuals all have an increased chromosome number in comparison with *F*₁, most of them probably having arisen through fertilization of unreduced or multiplied ♀ gametes by ♂ gametes from *F. arundinacea*, others are explained as results of back crossings with *F. pratensis*. Most of the plants seem to have complete genomes from the parent spp. in different multiplicities. The importance of the progenies obtained from taxonomic and breeding points of view is pointed out.—Auth. summ.

217. NILSSON, FREDRIK. Tetraploidia hos pärönpplantor framkallad med hjälp av colchicin. [Tetraploidy in pears induced by colchicine treatment.] *Sveriges Pomol. Fören. Årsskr.* 41: 103-107. 1940.—Seeds of 2-pear vars. were germinated in colchicine solns. of a strength varying between 0.25 and 1.00%. Afterwards most of the seedlings were also treated with 2% colchicine agar. Many of the seedlings died and only $\frac{1}{3}$ of them survived, of which 2 seem to be pure tetraploids and slow-growing with rounder and thicker leaves and larger stomata. From the treatment with colchicine agar some seedlings show a tetraploid type of leaves although the roots are diploid.—Auth. summ.

218. PIETTRE, LISETTE. Action de la colchicine sur les végétaux. *Compt. Rend. Soc. Biol.* 131(22): 1095-1097. 4 fig. 1939.—Expts. carried out on *Aegilops triuncialis*, *Zea*, Manitoba wheat, *Cucurbita pepo*, *Taraxacum dens-leonis*, *Lepidium sativum*, *Camelina sativa*, *Capsella viguieri*, flax from Morocco, *Papaver somniferum*, Adzuki III, Bellevue (*Phaseolus*), *Humulus*, *Cannabis sativa*, *Fagopyrum esculentum*, *Polygonum spinulosum*, and *Marchantia polymorpha* show that colchicine is capable of transforming very different organs of the same plant thus creating the monstrosities (which are described in detail).—H. Simons.

219. PIRSCHE, KARL. Ist der "d-Stoff" von Petunia artspezifisch? *Biol. Zentralbl.* 60(5/6): 318-326. 4 fig. 1940.—The leaves of *Nicotiana tabacum* and *Solanum lycopersicum* in reciprocal heteroplastic grafts with the chlorophyll defective mutant (*dd*) of *P. nyctagineiflora* become bleached out when the *d*-plant is used as the stock and to a less degree when it is used as the scion. Preliminary results with *Hyoscyamus niger* are similar. While the results are not similar in all respects to those obtained in homoplastic grafts between the *dd* and *DD* plants of *Petunia* yet they allow the conclusion that the gene dependent *d*-substance is not species-specific.—A. H. Hersh.

220. RANDOLPH, L. F. (Cornell U.) An evaluation of induced polyploidy as a method of breeding crop plants. (With discussion by GEORGE M. DARROW.) *Amer. Nat.* 75(759): 347-365. 1941.—Induced polyploidy is suggested as a way of restudying the origin, evolution and relationships of crop plants. The author stresses the need of trained cytological help in using polyploidy as an aid in breeding; gives suggestions as to ways of obtaining improved Logan types of berries by the use of polyploid blackberry series; and refers to the origin of the Pacific Coast blackberry from a cross of a dewberry and a black raspberry.—G. M. Darrow.

221. SEARS, E. R. (U. Missouri.) Nullisomics in *Triticum vulgare*. *Genetics* 26(1): 167-168. 1941.—An abstract.

222. SHAFFER, JOHN Jr., and R. G. WIGGANS. (Cornell U., Ithaca.) Correlation of total dry matter with grain yield in maize. *Jour. Amer. Soc. Agron.* 33(10): 927-932. 1941.—The data employed were obtained from plants harvested at silage-cutting time and dried. Single-cross, double-cross, and top-cross populations were studied. For the 8 large populations of heterogeneous origin, the cor-

relation coefficients (*r*) varied between 0.6 and 0.85. For a few small populations, the correlation was much less. Of the better half of a group of crosses, classified on the basis of grain yield, 80% were also in the upper half on the basis of total dry matter. A "grain test" based on the detn. of the above-mentioned correlations might be useful in a large silage-corn breeding program as a prelim. test to eliminate many of the poorer crosses, before more careful testing for total dry matter and ratio of total dry matter to dry grain is undertaken.—Authors.

223. SINNOTT, E. W., A. F. BLAKESLEE, and ALICEA FRANKLIN. A comparative study of fruit development in diploid and tetraploid cucurbits. *Genetics* 26(1): 168-169. 1941.—An abstract.

224. SPRAGUE, G. F. (Iowa State Coll.) Transmission tests of maize mutants induced by ultra-violet radiation. *Iowa Agric. Exp. Sta. Res. Bull.* 292. 389-407. 4 fig. 1941.—Transmission tests were made for a number of maize mutants induced by u-v. radiation. Of 78 inviable types, the mutant form was recovered in *F*₂ in 71 cases. Male and ♀ transmission rates were obtained for 23 viable mutant types. In 14 cases ♂ and ♀ transmission rates were equal. Concomitant derangements (2 or more induced changes in the same gamete) were shown to be separable and hence probably of different origins. The high frequency of these multiple cases was related to the distribution of sperm within the pollen grain and the high degree of absorption of u-v. radiation by the pollen grain. Arguments are advanced for concluding that at least some of the changes studied were intra-genic in origin.—G. F. Sprague.

225. STEIN, EMMY. Über die Blühfähigkeit von *Antirrhinum siculum* mut. sterilis. *Biol. Zentralbl.* 60(3/4): 166-174. 2 fig. 1940.—The sterilis mutant, produced by radium irradiation of seeds, has a strong purely apical growth. Under ordinary conditions it produces neither side branches nor flower anlagen. Conditions of increased light exposure fostered the production of flowers over a series of quite well stabilized transitional forms. With 9 hrs. daily exposure the leaves were all of the vegetative type. Under 12 hrs. daily exposure the upper leaves were short and scale like but were still separated by short internodes; with longer treatment the apical scale type leaves were pressed together, some of which were petaloid structures that produced anthers with functional pollen. In continuous 24-hr. daily exposure bizarre flowers with ♂ and ♀ organs developed. In one case after selfing seeds were formed.—A. H. Hersh.

226. STRAUB, J. Quantitative und qualitative Verschiedenheiten innerhalb von polyploiden Pflanzenreihen. *Biol. Zentralbl.* 60(11/12): 659-669. 4 fig. 1940.—The progressive increase in flower size in polyploid series of *Antirrhinum majus*, *Torenia fournieri*, *T. flava*, *Impatiens sultana* and *Lupinus luteus* does not affect all parts equally. The progressive change in flower form can in the main be explained as a relatively greater growth in breadth. The height/breadth index in *A. majus*, for example, changed from 1.26 for the haploid to 0.74 for the octoploid. The position of the anthers changes; in 8n *Torenia* the members of the longer pair extend laterally out over the corolla. With increasing polyploidy there is an increase in anthocyanin and carotene content of the flowers; the yellow spot of *Torenia* represents a 6-fold increase in carotene per cell in the 8n as compared to that of the 2n flowers. In 4n *Impatiens* there is a 2.6-fold increase of anthocyanin per cell over the 2n flower. Changes in form and color which accompany the increase in flower size no doubt have a selective effect, having regard to the color sense of insects and the rôle played in pollination by the altered position of the anthers.—A. H. Hersh.

227. STUBBE, H. Kritische Bemerkungen zu *Antirrhinum rhinanthoides* Lotsy. *Biol. Zentralbl.* 60(11/12): 590-597. 5 fig. 1940.—Lotsy established *A. rhinanthoides* from plants which appeared in the *F*₂ generation from a hybridization of *A. molle* and *A. majus*. Numerous *F*₂ segregations of these 2 spp. have since failed to produce a single form which corresponds to *A. rhinanthoides*. But the simple mendelian recessive, *fistulata*, is exactly like it phenotypically. Lotsy's original material no doubt contained this mutant in heterozygous condition.—A. H. Hersh.

228. TYDEMAN, H. M. (East Malling, Kent.) The

inheritance of susceptibility to sulphur damage in families of seedling apples. *Jour. Pomol. and Hort. Sci.* 19(1/2): 137-145. 1941.—Certain vars. of apples, such as Stirling Castle and Lane's Prince Albert are extremely susceptible to lime-sulfur that is used as a control of scab. There are vars., however, that show no damage from applications of lime-sulfur. The reaction of seedlings from crosses between numerous apple vars. to spring applications of S compounds is given. The seedlings were grown on root-stock Malling IX as cordons. Where the highly susceptible var. Stirling Castle was used as a parent, the proportion of sulfur-shy seedlings was usually high, depending upon the other parent used. Families having as parents either White Transparent, Rote Sommer Apfel, or Cox's Orange Pippin appeared to have on the av. from 7% to 54% of sulfur-shy seedlings. In families involving Yellow Ingesterie, Devonshire Quarrenden, Laxton's Superb, Brownlee's Russet and McIntosh Red, the proportion of seedlings designated as sulfur-shy tended to be considerably less. None of the seedlings from crosses with Golden Delicious showed any signs of susceptibility to S damage. Of families involving Cox's Orange Pippin as one parent, only that with Blenheim Orange gave the largest proportion (25%) of S-shy seedlings. Of 3 families involving White Transparent as one parent, only that with Rote Sommer Apfel gave the largest proportion (17%) of S-shy seedlings. Rote Sommer Apfel \times St. Cecilia resulted in 29% S-shy seedlings, the largest proportion of the 6 families having Rote Sommer Apfel as a parent.—E. L. Overholser.

229. ULLSTRUP, ARNOLD J. Inheritance of susceptibility to infection by *Helminthosporium maydis* Race I in maize. *Jour. Agric. Res.* 63(6): 331-334. 1 fig. 1941.—Back-cross, F_2 , and F_3 generations of crosses between the susceptible inbred line Pr and 3 resistant inbreds, namely, Pr \times Hy, Pr \times Tr, and Pr \times 38-11 were used to study the inheritance of susceptibility to infection by *H. maydis* Race I. Seedlings of the above progenies were grown in the greenhouse and inoculated, when in the 3-4 leaf stage, by spraying them with a spore suspension of the parasite. One week following inoculation data were recorded on segregation of resistance and susceptibility. In the F_2 progenies involving 1766 seedlings 1325 were resistant and 441 were susceptible; in the back-cross progenies out of 1746 seedlings tested 882 were resistant and 864 susceptible. In 275 F_3 families tested 74 proved to be resistant, 141 were segregating and 60 were found susceptible. Deviations in the above segregations from the expected 3:1, 1:1 and 1:2:1 ratios respectively are not significant. It is concluded that susceptibility is governed by a single recessive gene. The gene pair conditioning resistance and susceptibility has been designated as *Hm hm*.—A. J. Ullstrup.

230. WARMKE, H. E., and A. F. BLAKESLEE. (Carnegie Inst., Cold Spring Harbor, N. Y.) A dioecious 4n race in *Melandrium* deficient for two sex chromosomes. *Genetics* 26(1): 173. 1941.—An abstract.

231. WIEBE, G. A. Some problems in breeding barley for industrial use. *Brewers' Digest* 15(11): 189T. 1940.—Barley is native to Southwestern Asia and Abyssinia. There are about 3500 strains of barley in the collection of the Division of Cereal Crops and Diseases of the U. S. Dept. of Agric., affording a wealth of strains from which a plant-breeder can select parents that will give a barley of the desired qualities. This selection may be difficult: usually one of the parents is a commercial var., suitable for farming, while the other is a non-commercial type, possessing the desired characters which the commercial var. lacks. Since all the desired characters seldom exist in one var., several crosses must be made to bring about the desired result. It takes about 7 or 8 generations before the characteristics inherited from the parents of the original cross become fixed. To shorten this period, a greenhouse is often used to grow 2 crops a yr., or one crop is grown in Southern California or Arizona during the winter, while another is grown in a northern state during the summer. Prelim. tests are made and unsuitable plants discarded. Finally, perhaps a dozen selections are left. These are then given an intensive test over a period of at least 5 yrs. to determine their suitability for farm and industrial use. In general, 15 to 20 yrs. is required to produce a new var. and another 3-4 yrs. are needed before the impact of the new var. is felt in industry.

The problem of the plant breeder is simplified if the requests from industry are specific. Industry must determine what it wants in a barley. When breeding for quality factors, the breeder must also work in close cooperation with the chemical laboratory. Barley of highest quality grown under ideal conditions must be resistant to disease, to drought, to lodging, etc., or it has no value as a superior var. An active program of breeding barleys for industrial use is being carried on by the U. S. Dept. of Agric., by State Expt. Stations, the Barley Improvement Council, the U. S. Maltsters' Association, and the Malt Research Institute.—Courtesy *Communications Wallerstein Lab.*

ANIMAL (EXCEPT MAN)

232. AUERBACH, C. (U. Edinburgh.) The effect of sex on the spontaneous mutation rate in *Drosophila melanogaster*. *Jour. Genetics* 41(2/3): 255-265. 1941.—The spontaneous sex-linked mutation rate in the 2 sexes was compared in various stocks, chiefly in isogenic wild-type reared under identical conditions. It was found to be markedly higher in the ♂ (0.48% \pm 0.11%). Considerable fluctuations were observed even within single expts., emphasizing the need for strict control of conditions and for randomizing the remaining variations.—H. B. Glass.

233. BERGE, S. Three hereditary anomalies in pigs. *Hereditas* 27: 176-192. 1941.—Three hereditary defects that occurred in breeds of Norwegian Landrace and Large White swine at the Pig Breeding Station at Aas, Norway, are deser. A defect causing congenital paralysis of the hind legs was found to be a monofactoral recessive. It is evidently identical with similar cases reported by Wriedt (1929) and Mohr (1929). Other hereditary lethal defects affecting legs in swine are compared and discussed. The literature on scrotal hernia is briefly reviewed and the incidence of hernia is given for pigs at the Station. A high incidence of scrotal hernia in certain lines indicates an hereditary basis but certain sporadic cases could not be attributed to heredity. It was concluded that scrotal hernia was probably conditioned by one incompletely dominant factor, the penetrance in ♂♂ being probably < 50%. The factor had no influence in the sow. The 3d lethal was atresia ani. Cases reported by other investigators were reviewed along with original data presented. Variations of the expression of the character are discussed. The author suggests that 2 factor pairs may be involved but is uncertain of dominance and factor interaction. The elimination of deleterious characters when the complete mode of inheritance is unknown is discussed. The author also reports cases of congenital blindness which are probably caused by vitamin A deficiency.—P. W. Gregory.

234. BERGE, S. (Agric. Coll., Aas, Norway.) The inheritance of paralysed hind limbs, scrotal hernia and atresia ani in pigs. *Jour. Heredity* 32(8): 271-274. 3 fig. 1941.—A paralysis of the hind legs occurs and follows the inheritance pattern of a sublethal recessive factor. A similar anomaly which has been called recumbent occurred less frequently than would be expected if a monogenic recessive factor were responsible. Histological examination showed degenerative atrophy of the motor cells. A sublethal anomaly called thick legs resembles elephantiasis and is caused by a disturbance in the circulatory system and the data suggest a monogenic recessive heredity. Bent legs, another affliction, is reported as a lethal. It also affects the forelegs. Digenic recessive inheritance of scrotal hernia is suggested by Warwick but the author suggests incomplete dominance. Photographs of 3 dissected pigs with atresia ani are presented as a supplementary document. Inheritance is irregular and numbers too small to permit accurate analysis. The author suggests 2 pairs of factors to be responsible. A case of congenital blindness suspected of being hereditary proved to be due to a Vitamin A deficiency in the feed of pregnant sows.—L. M. Dickerson.

235. BLAIR, W. FRANK. (U. Michigan.) Extremes of color variation in a stock of the Chihuahua deer-mouse from one locality in southern New Mexico. *Genetics* 26(1): 138. 1941.—An abstract.

236. BLANC, R. (U. California.) Histolytic action of vestigial alleles in *Drosophila melanogaster*. *Genetics* 26(1): 139. 1941.—An abstract.

237. BLANC, R., and C. VILLEE. (U. California.) Dif-

ferential reactions of various scute stocks of *Drosophila melanogaster* to X-radiation. *Genetics* 26(1): 140. 1941.—An abstract.

238. BREHME, KATHERINE S. (Carnegie Inst., Cold Spring Harbor, N. Y.) Time relations during development of Minute larvae in *Drosophila melanogaster*. *Genetics* 26(1): 141. 1941.—An abstract.

239. BRUCKNER, J. H. (Cornell U.) Inheritance of plumage color in *Phasianus colchicus*. *Genetics* 26(1): 142. 1941.—An abstract.

240. BUCHMANN, W., und G. SYDOW. Weitere Versuche an *Drosophila melanogaster* über die Einfluss von Schwermetallsalzen auf die Mutationsauslösung durch Röntgenstrahlen. Versuche mit Uranylacetat. *Biol. Zentralbl.* 60(3/4): 137-142. 1940.—About 40%-50% of 1- to 2-day-old wild-type ♂♂ died after 3-4 days on food containing 1% uranylacetate. For the survivors the sex-linked mutation rate (CIB-method) increased significantly from 8.6% to 14.9%, after an X-ray treatment of 3000r. The few visible mutations affected mostly the wings.—A. H. Hersh.

241. BURDETTE, WALTER J., and LEONELL C. STRONG. (Yale U. Sch. Med.) The incidence of methylcholanthrene-induced tumors in inbred strains of mice. *Genetics* 26(1): 143. 1941.—An abstract.

242. BUSHNELL, RALPH J. (U. Connecticut, Storrs.) Characteristics of eggs laid by the hybrids of Indian Runner by Muscovy. *Genetics* 26(1): 143-144. 1941.—An abstract.

243. CAROTHERS, E. ELEANOR. (Iowa State U., Iowa City.) Interspecific hybridization in the Acrididae (Trimerotropis citrina \times T. maritima). *Genetics* 26(1): 144. 1941.—An abstract.

244. CHASE, HERMAN B. (U. Illinois.) Genetics and embryology of an anophthalmic strain of mice. *Genetics* 26(1): 144. 1941.—An abstract.

245. COLE, RANDALL K., and JACOB FURTH. (Cornell U.) The genetics of spontaneous mouse leukemia. *Genetics* 26(1): 145-146. 1941.—An abstract.

246. CREW, F. A. E., and C. AUERBACH. (U. Edinburgh.) "Pigtail," an hereditary tail abnormality in the house mouse, *Mus musculus*. *Jour. Genetics* 41(2/3): 267-274. 2 pl., 2 fig. 1941.—Pigtail is a recessive skeletal abnormality resembling flexed tail. In a small proportion of litters, especially the inbred, spina bifida aperta occurred. Penetration varies around 20% in genetically pigtail litters, being uncorrelated with age of mother, degree of expression in parents, degree of inbreeding or selection, but being negatively correlated to a slight degree with litter size. The most probable genetic explanation is that pigtail is due to a recessive gene, with modifiers and some intrauterine condition affecting its penetration in homozygotes.—H. B. Glass.

247. CUMLEY, R. W., and M. R. IRWIN. (U. Wisconsin, Madison.) Immunogenetic studies of serum proteins following a species cross in doves. *Genetics* 26(1): 146-147. 1941.—An abstract, briefly discussing the inheritance of immunological characters in Pearneck (*Streptopelia chinensis*) \times Ring Dove (*S. risoria*) crosses.

248. DEMEREC, M., and B. P. KAUFMANN. (Carnegie Inst., Cold Spring Harbor, New York.) Time required for *Drosophila* males to exhaust the supply of mature sperm. *Amer. Nat.* 75(759): 366-379. 1941.—Males of the wild-type Swedish-b stock of *D. melanogaster* were treated with 3000r. of X-radiation and repeatedly mated on the day of treatment, on the 6th day, the 7th day, the 12th day and the 19th day thereafter. A drop in the % of dominant lethals was not observed until the 19th day, indicating that the sperm which was immature at the time of treatment does not become available until some time after 12 days. Individual ♂♂ apparently vary considerably. The less affected sperm seems to become available between 15 and 19 days after treatment, provided the sperm which was mature at the time of treatment has previously been used. When ♂♂ copulated for the first time on the 19th day after the treatment 2 copulations did not exhaust the old sperm. The fully matured sperm available for immediate transfer may become exhausted in a few consecutive matings.—Authors.

249. DIEDERICH, GERTRUDE WYLIE. (U. Chicago.) Non-random mating between yellow-white and wild type *Drosophila melanogaster*. *Genetics* 26(1): 148. 1941.—An abstract.

250. DUNNING, W. F., and M. R. CURTIS. (Columbia U.) Longevity and genetic specificity as factors in the occurrence of spontaneous tumors in the hybrids between two inbred lines of rats. *Genetics* 26(1): 148-149. 1941.—An abstract.

251. DURAND, ERIC, ALEXANDER HOLLAENDER, and M. B. HOULAHAN. The absorption of ultraviolet radiation by the abdominal wall of *Drosophila melanogaster*. *Genetics* 26(1): 149. 1941.—An abstract.

252. FANKHAUSER, G. (Princeton U.) The effects of pentaploidy on development in the newt, *Triturus viridescens*. *Genetics* 26(1): 150. 1941.—An abstract.

253. FANO, U., and M. DEMEREC. (Carnegie Inst., Cold Spring Harbor, N. Y.) Measurements of the frequency of dominant lethals induced in sperm of *Drosophila melanogaster* by X-rays. *Genetics* 26(1): 151. 1941.—An abstract.

254. GELEI, G. v., und L. CSIK. Die Wirkung des Colchicins auf *Drosophila melanogaster*. *Biol. Zentralbl.* 60(5/6): 275-286. 6 fig. 1940.—Flies die without progeny on food containing colchicine in concs. of 1/1000-1/200000; in concs. of 1/300000-1/400000 the flies live, producing fewer progeny than normal and a greater number of XXY ♀♀ and XO ♂♂. These occur in equal numbers. Developmental non-hereditary anomalies are increased from 0.05% for the controls to 0.58%. The data support the view that colchicine tends to distort the mitotic and meiotic mechanisms and is perhaps a plasm poison.—A. H. Hersh.

255. GEROULD, J. H. (Dartmouth Coll., Hanover, N. H.) Genetics of butterflies (*Colias* spp.). *Genetics* 26(1): 152. 1941.—An abstract.

256. GOODRICH, H. B., MYRON S. ARRICK, and G. A. HILL. (Wesleyan U., Middletown, Conn.) Gene-controlled pigments in *Platypoecilus* and *Xiphophorus* and comparisons with other tropical fish. *Genetics* 26(1): 152-153. 1941.—An abstract.

257. GORDON, MYRON. (Amer. Mus. Nat. History, New York.) Comparable interaction of hereditary factors from "wild" and "domesticated" populations in intra-specific and intergeneric crosses of fishes. *Genetics* 26(1): 153. 1941.—An abstract.

258. GREEN, M. M., and C. P. OLIVER. (U. Minnesota, Minneapolis.) Influence of pigment genes on the homozygous vg phenotype in *Drosophila melanogaster*. *Genetics* 26(1): 154. 1941.—An abstract.

259. GRIFFEN, A. B. (U. Texas, Austin.) The B^s translocation in *D. melanogaster* and modifications of the Bar effect through irradiation. *Genetics* 26(1): 154-155. 1941.—An abstract.

260. HAGER, RUSSELL P. (U. Illinois.) Cytological studies of the Bar alleles of *Drosophila melanogaster*. *Genetics* 26(1): 155. 1941.—An abstract.

261. HINTON, TAYLOR (Columbia U.), and A. H. SPARROW (McGill U.) The non-random occurrence of terminal adhesion in salivary chromosomes of *Drosophila*. *Genetics* 26(1): 155-156. 1941.—An abstract.

262. HUTT, F. B., R. K. COLE, and J. H. BRUCKNER. (Cornell U.) Four generations of fowls bred for resistance to neoplasma. *Poultry Sci.* 20(5): 463-464. 1941.—An abstract.

263. IVES, P. T. (Amherst Coll., Amherst, Mass.) Genetic analysis of natural populations of American *Drosophila melanogaster*. *Genetics* 26(1): 156. 1941.—An abstract.

264. KALISS, NATHAN, and L. CABOT BRIGGS. Coat color inheritance in Bullterriers. *Genetics* 26(1): 156-157. 1941.—An abstract.

265. KEELER, CLYDE E. (Wistar Inst., Philadelphia.) Hereditary shape differences in the foramen magnum of inbred rats. *Genetics* 26(1): 157-158. 1941.—An abstract.

266. KIMBALL, R. F. (Johns Hopkins U.) The inheritance of mating type in the ciliate protozoan *Euplotes patella*. *Genetics* 26(1): 158. 1941.—An abstract.

267. KINSEY, A. C. (Indiana U.) Local populations in a gall wasp. *Genetics* 26(1): 158-159. 1941.—An abstract, reporting studies on *Biohiza eburnea*.

268. KOBOLZIEFF, N., et N. A. POMRIASKINSKY-KOBOLZIEFF. Nouvelles recherches sur la constitution génotypique de souris anoures appartenant à la lignée agouti et se reproduisant sans ségrégation. *Compt. Rend. Soc. Biol.* 131(22): 1087-1090. 1939.

269. KÜHN, ALFRED, und MELITTA von ENGEL-HARDT. Ein das Flügelmuster beeinflussender Lethalfaktor bei *Ptychopoda seriata*. *Biol. Zentralbl.* 60(11/12): 561-566. 3 fig. 1940.—The dominant lethal mutation, Series confusae (Sec), brings about a fusion of 2 rows of the distal black spots of the wing pattern. A heat shock of 45°C for 45 min., applied to 36- to 48-hr-old wild-type pupae, produces a similar effect. The homozygotes die in an early embryonic stage.—A. H. Hersh.

270. LAMOREUX, W. F. (Cornell U.) Hereditary chondrodystrophy in the fowl. *Poultry Sci.* 20(5): 465. 1941.—An abstract.

271. McCLARY, CECIL F., and GORDON E. BEARSE. (Western Washington Exp. Sta.) A recessive autosomal factor for slow feathering in single comb white leghorn chicks. *Poultry Sci.* 20(5): 466-467. 1941.—An abstract.

272. MacDOWELL, E. C., J. S. POTTER, M. J. TAYLOR, and E. N. WARD. (Carnegie Inst., Cold Spring Harbor, N. Y.) A second back-cross test for determiners of spontaneous leukemia [in mice]. *Genetics* 26(1): 160. 1941.—An abstract.

273. MACKENZIE, K., and H. J. MULLER. (U. Edinburgh.) Mutation effects of ultra-violet light in *Drosophila*. *Proc. Roy. Soc. Ser. B: Biol. Sci.* 129(857): 491-517. 1940.—The frequency of mutation induced in *Drosophila* sperm by u-v. may be brought to approx. 5%. The region in which the mutation-inducing effect begins lies between 320 and 300 m μ , as expected for nucleic acid absorption. U-v. rays, as compared with x-rays of the same gene-mutational strength, are ineffective in causing gross structural changes of chromosomes, and also, probably ineffective in producing minute structural changes. This indicates that activation of nucleic acid by u-v. is ineffective in producing breakage of the chromosomes, although it is effective in producing gene mutation. This lends support to the conception that the "genes" represent definite segments of the chromonema, and that the connections between the parts of these segments are different in kind from the connections between the segments.—F. R. Hunter.

274. MATHER, K. (John Innes Hort. Inst., Merton, Eng.) Variation and selection of polygenic characters. *Jour. Genetics* 41(2/3): 159-193. 1 pl., 10 fig. 1941.—Polygenic, i.e., quantitative variation, as the raw material of species differentiation, was studied by observing the action of selection upon the number of hairs on the ventral surface of the 4th and 5th abdominal segments of *Drosophila melanogaster*. In one cross ($y, y \times f^B B^b$) following selection for high and low hair number from the F_2 onwards, the main advance was achieved in the first 2 selected generations. Probably recombination of whole chromosomes was responsible here. In a 2d cross ($BB \times +$), an advance in the first 2 selected generations was followed by a period of stability, to be succeeded in turn by a 2d and larger advance. Following verification by various tests, this 2d advance was interpreted as a result of selective action on variation released by recombination that broke up balanced polygenic combinations within a pair of chromosomes.—Such balanced combinations would be developed by the action of natural selection. They would be subject to internal balancing in homozygotes, to relational balancing in heterozygotes, the relative preponderance of the 2 having effects upon the breeding mechanism of the population, heterosis, the origin of isolation mechanisms, and polymorphism.—If the optimum frequency of polygenic combinations varies with environmental conditions, "clines" of any completely linked genetic traits would arise, as described in bridled guillemots.—H. B. Glass.

275. MAW, A. J. G. (Iowa State Coll.) Crosses between inbred lines of the domestic fowl. *Poultry Sci.* 20(5): 465. 1941.—An abstract.

276. MELLO, FRANCO de. Nachweis der Bildung von a⁺-Wirkstoff durch die Haut und den Fettkörper bei *Ephestia kuhniella* Z. *Biol. Zentralbl.* 60(3/4): 174-179. 3 fig. 1940.—The fat body and pieces of the dorsal integument of the last larval stage of the black-eyed a-race transplanted to the last larval stage of the red-eyed a-race darken the imaginal eyes and testes of the hosts. The correlation between the pigmentation of the eyes and the testes is high, $r = 0.62 \pm 0.06$.—A. H. Hersh.

277. MILLER, DWIGHT D. (U. Rochester.) Inter-specific hybrids involving *Drosophila athabasca*. *Genetics* 26(1): 161. 1941.—An abstract.

278. NEEL, JAMES. (Dartmouth Coll., Hanover, N. H.) A relation between larval nutrition and the frequency of crossing over in the adult of *Drosophila melanogaster*. *Genetics* 26(1): 163. 1941.—An abstract.

279. OLIVER, C. P. (U. Minnesota, Minneapolis.) Crossing over between two alleles of lozenge in *Drosophila melanogaster*. *Genetics* 26(1): 163. 1941.—An abstract.

280. PIPKIN, SARAH BEDICHEK. (North Texas Agric. Coll., Arlington, Texas.) Intersex modifying genes in wild strains of *Drosophila melanogaster*. *Genetics* 26(1): 164-165. 1941.—An abstract.

281. PONTECORVO, G. (U. Edinburgh.) The induction of chromosome losses in *Drosophila* sperm and their linear dependence on dosages of irradiation. *Jour. Genetics* 41(2/3): 195-215. 1 fig. 1941.—Non-lethal losses of the X and Y chromosomes, produced by X-ray treatment of mature sperms, were detected by testing exceptional $y w f \text{♀♀}$ obtained from crosses of $y w f$ attached-X/sc.Y^L ♀♀ by f X.Y^s/sc.Y^L irradiated ♂♂. The tests indicated that $64-71\% \pm 7-9\%$ of the exceptional yellow ($w f$) ♀♀ had arisen from a complete loss of either the X.Y^s or the sc.Y^L chromosome. These losses are not lethal to the zygote, but a comparison with data showing the amount of change in the sex ratio caused by equivalent dosages indicates that lethal losses are probably three times as numerous as non-lethal.—At dosages of 0, 1000 r, and 4000 r the frequencies of the non-lethal losses vary approximately as a linear function of the dosage and certainly less than the 1.5 power of the latter, like gross rearrangements. The mechanism whereby these losses originate is therefore held to be through single breakage, followed by a lateral fusion of sister chromatids at the breakage point. This results in the formation of dicentric chromosomes that immediately or subsequently become lost.—H. B. Glass.

282. PONTECORVO, G., and H. J. MULLER. (U. Edinburgh.) The lethality of dicentric chromosomes in *Drosophila*. *Genetics* 26(1): 165. 1941.—An abstract.

283. SALISBURY, G. W., and J. W. BRITTON. (Cornell U.) The inheritance of equine coat color, II. The dilutes, with special reference to the Palomino. *Jour. Heredity* 32(8): 255-260. 1 fig. 1941.—From a study of stud-book matings the hypothesis was developed that the Palomino color in horses is produced by an incompletely dominant dilution gene superimposed over the basic chestnut or sorrel color. This same gene produces a dilute which is dun, buckskin or mouse in combination with the basic colors, bay, brown or black. Results of actual breeding practice by Palomino breeders support the hypothesis and further show that the homozygous dilute chestnut or sorrel is almost entirely devoid of hair pigment and has pink skin and china eyes.—G. W. Salisbury.

284. SCHUCKMANN, W. von. Über Dauermodifikationen bei *Colpoda steini*. *Biol. Zentralbl.* 60(5/6): 239-257. 5 fig. 1940.—An amicronucleate and a micronucleate clone of *C. steini*, which tolerated, respectively, a maximum dose of 7% and 13% of a N/10 solution of As₂O₃ were gradually brought to tolerate arsenic concs. of 35% and 30%, respectively. The resistance to As was gradually lost in As-free medium after thousands of generations over a long period of time. The probability is too low to accept the conclusion that the gradual development of the increased resistance in these clones was the result of a series of mutations and that the gradual loss of the increased resistance was the result of a series of reverse mutations. It obviously is not an ordinary modification. The increased resistance is a plasmatically conditioned dauermodifikation.—A. H. Hersh.

285. SNELL, G. D. (Roscoe B. Jackson Memorial Lab., Bar Harbor, Maine.) Linkage studies with induced translocations in mice. *Genetics* 26(1): 169. 1941.—An abstract.

286. STURKIE, PAUL D. (Alabama Exp. Sta.) A new type of nakedness in the domestic fowl. *Poultry Sci.* 20(5): 474. 1941.—An abstract.

287. SUTTON, E. (Carnegie Inst., Cold Spring Harbor, N. Y.) A terminal deficiency in *Drosophila melanogaster*. *Genetics* 26(1): 172. 1941.—An abstract.

288. TIMOFÉEFF-RESOVSKY, N. W. Spontane und strahleninduzierte Mutabilität in geographisch verschiedenen

after the 50th year than do the Negro people. Half the original 1,000 births among whites are still alive the 66th yr. of life, while barely half the San Juan Indians remain at the 53d yr. The expectation of life in the pueblo for the present time is 43.2 yrs., or 17 yrs. higher in ages 20-30 than in 1790.—Authors.

• 304. ADAIR, FRED L. The larger aspects of maternal care. *Jour. Heredity* 31(9): 412-416. 1940.—This is an abridgement of an address delivered at the First American Congress on Obstetrics and Gynecology, Cleveland, Ohio. The importance of safeguarding the heredity as well as the environment of the human infant is stressed. The importance of pre-marital and pre-conceptional care of the mother and the peculiar physiol. and psychological relationships between mother and offspring are emphasized.—L. M. Dickerson.

305. ALLEN, C. The relation of the psyche to the endocrine glands. *Jour. Mental Sci.* 84: 1091-1092. 1938.—Abstract.

306. BAUER, J. Homosexuality as an endocrinological, psychological, and genetic problem. *Jour. Crim. Psychopath.* 2: 188-197. 1940.—The author examines critically the evidence supporting the theories that homosexuality is: (1) endocrinologically, (2) psychologically, and (3) genetically detd. He believes "the basic underlying cause of homosexuality is an abnormality of the chromosomal structure with a subsequent differentiation of certain cerebral functions, extending to other functions and structures in a variable degree." The genetic conception does not give a favorable outlook insofar as the treatment of homosexuality is concerned. Although lesser cases may respond favorably to psychological and hormonal therapy, the full-fledged homosexual is never really cured.—A. Chapanis (*in Psychol. Abstr.*).

307. BOGARDUS, EMORY S. Sociology. Rev. ed. xii + 567p. Macmillan Co.: New York, 1941. Pr. \$3.—This revision, the first extensive one since the 1st edition in 1934, brings the subject matter and bibliographies up to date. The first 5 editions (1913-1931) were published under the title of *Introduction to Sociology*. The main theme is the social group as the center of human interaction, as the matrix of social processes and social changes, and as the realm within which personalities originate, develop, and mature. The social group is the main laboratory of sociology. Ecological, cultural, and psycho-social factors are given prominence throughout the treatment. The progressive changes in personality under the many influences that play upon it through group processes are made the central dynamic core of this work. It falls into 3 parts: part 1 deals with group approaches, defines social groups, and discusses ecological, cultural, and psycho-social approaches. Part 2 deals with the family, community, occupational, play, educational, religious, and social groups. Part 3 deals with group organizations, discussing group controls, disorganization, changes, and leadership and outlines the methods of group research. Chapter and terminal bibliographies are added.—C. A. Koford.

308. BULL, NINA. (*Columbia U.*) The biological basis of value. *Sci. Month.* 53(2): 170-174. 1941.—An attempt is made to explain human activities on the basis of the 2 fundamental values, danger and security and the instinct of self-preservation. Play, for instance, in addition to its educational and recreational values, acquires tremendous values in prestige, which means survival in the group. Another example is intolerance which results from not appreciating how self-preservation works in other people. Many similar examples are cited.—F. R. Hunter.

309. BURGESS, ERNEST W. Predicting adjustment in marriage. *Jour. Heredity* 30(12): 557-564. 1939.—Six factors are accepted as having basic significance in determining success in marital adjustments; namely, (1) personality characteristics, (2) cultural backgrounds, (3) socialization, (4) economic status, (5) response patterns, and (6) sex desires. Psychological and cultural factors are considered the most significant. The economic factor is not considered to play a significant independent rôle. Biol. factors have not received adequate study. The most important future research project in the field of marriage adjustment will probably be one that combines in its planning and prosecution the services of biologist and gynecologist as well as

the psychologist, psychiatrist and sociologist.—L. M. Dickerson.

310. CARPENTER, A. A critical study of the factors determining effective strength tests for women. *Res. Quart. Amer. Assoc. Health Physic. Educ.* 9(4): 3-32. 1938.—A critical review of various tests of strength, involving factor analysis. In the intercollegiate type and the Matin type tests, pure strength is the one outstanding factor; both strength and velocity are important factors in athletic performance, velocity being the more important of the two. Girth of arms and legs and width of joints do not indicate limb strength. Bibliography of 45 titles.—F. W. Finger (*in Psychol. Abstr.*).

311. CASE, VIRGINIA. Your personality—introvert or extravert? viii + 277p. Macmillan Co.: New York, 1941. Pr. \$2.50.—This book sets forth these 2 basic psychological types which are frequently misunderstood and misapplied, as complimentary to each other. Their relationships with other personalities are summed up for the introvert as incorporation and for the extravert as rapport. The 2 types are analysed and illustrated by 4 portrait sketches. How the 2 look to the world and how the world looks to each of them, how they deal with experience and express themselves, how they compare in intensity and extensity, how they judge and misjudge each other, and what may and may not be expected of each, are discussed at length. Their relationships to social groups and in marriage are compared. Ambivalence, or the cultivation of the opposite side of self is commended. A note on the terms "subjective" and "objective" is added. There are chapter summaries, suggested readings, and a bibliography.—C. A. Koford.

312. CHILD, C. M. Social integration as a biological process. *Amer. Nat.* 74(754): 389-397. 1940.—Physiol. and social integration are not merely analogous, but both depend on the most general potentialities of protoplasm to react to environment. Two groups of integrative factors are concerned in both: the one, transmissions of energy changes, attaining their highest physiol. development in nervous conduction, their highest social development in the various means of communication in modern society; the other, production, transport and effect of specific substances in the organism, commercial relations in society. Dominance and subordination, that is, control, appear in both physiol. and social integration. With relatively primitive and ineffective transmission or communication physiological and social isolation may occur, new dominance or government may arise and induce reorganization. In the simpler organisms, as in most primitive social integrations, dominance is wholly or largely a one way relation, but in the course of evolution there has been in general progress toward a democratic type of physiological integration, with many digressions and pauses. This fact has real significance for the future of social integration.—C. M. Child.

313. COHEN, BERNARD M., CHRISTOPHER TIETZE, and ELIZABETH GREENE. Statistical contributions from the mental hygiene study of the Eastern Health District of Baltimore. IV. Further studies on personality disorder in the Eastern Health District in 1933. *Human Biol.* 11(4): 485-512. 1939.—Studies of the geographic, biological, social and economic relationships of personality disorder (defined as incapacity for personal and social adjustment) in a small urban area, partially presented in an earlier paper, are continued here. The relationships are discussed in terms of prevalence rate differentials in respect to the above types of factors. The 2 major geographic divisions of the area, the northern and southern halves, differ greatly in prevalence of personality disorder in the white race, the southern half having twice the rate of the northern half. This difference is shown to be independent of every characteristic by which the 2 divisions can be compared. It is found in non-Jewish whites, in Jews, in all age groups, in both sexes, in families of every size, and in households of each grade of economic status and quality of housekeeping. The Negro populations of the 2 divisions, however, do not in general show this difference. Personality disorder in whites is strongly associated with Negro neighborhoods, but this is not true in the Negroes themselves since their rates do not vary with their own proportion of the population. Jewish rates are very much higher than those of non-Jewish whites, which may be due, in part at least, to

better case-finding among Jews. In whites, both Jewish and non-Jewish, and in Negroes alike, the personality disorder rate increases markedly with increasing family size, and with decreasing economic status and quality of house-keeping.—*Authors*.

314. COTTERMAN, C. W. (U. Michigan.) Relatives and human genetic analysis. *Sci. Month.* 53(3): 227-234. 2 fig. 1941.—An increasing interest is being shown in the study of relatives in connection with research in human biology and medicine. Data obtained in this way is often of great value to the human geneticist, for detailed family histories, involving many individuals, are not always necessary to give information concerning the inheritance of certain factors. Two relatives alone such as parent-child, sibs, or twins will often supply considerable information. It is important to record the circumstances under which each person was obtained for study, so that selected data may be recognized.—*F. R. Hunter*.

315. CRILE, G. A neuro-endocrine formula for civilized man. *Educ. Rec.* 22(Suppl. 14): 57-76. 1941.—The brain is the executive of energy and is controlled by the thyroid gland for its constant energy and the adrenal glands for its emergency energy. In animals below the higher apes and man, 1 g. of brain is required to execute 12,115 small calories in 24 hrs. The larger brain requires a larger thyroid gland for constant oxidation, while larger adrenal glands are required in wild life. This is borne out by the fact that the thyroid is relatively larger in civilized than in native man while the adrenals are smaller and that the adrenal glands of animals in the wild state are larger than the thyroid. That evolution cannot continue further in the direction of larger thinking brain and large thyroid gland is indicated by the increasing incidence of heart and vascular disorders, neurasthenia, and other so-called diseases of civilization.—*F. C. Paschal (Psychol. Abst.)*.

316. DAYTON, N. A., and B. TRUDEN. Age of mother at birth of child and incidence of mental retardation in the children; study of 23,422 families of public school children examined by fifteen Massachusetts traveling psychiatric school clinics, 1921-1935. *Amer. Jour. Ment. Defic.* 45: 190-200. 1940.—33% of mothers at birth of child showing behavior problems, retardation, or mental deficiency were 15-24 yrs. of age; 47% were 25-34 yrs. old; and 19% were aged 35-49 yrs. Comparison with the ages at which children are born to mothers in the general population was made. Incidence rates were detd. in mental status groups in the age-of-mother groups. In the normal group (chiefly behavior problems) no relationship between age of mother and the incidence of the condition was observed. Advanced age of the mother is an etiologic factor in a certain portion of children of dull normal, borderline, moron, and imbecile groups. In all classifications, the high rates for incidence of the condition are observed in children of mothers aged 35-49 yrs. Outstanding differences in the imbecile group suggest an exhaustion process in the mother as the basic causative factor. The older age of the mother at birth of the child appears to be of greater significance etiologically in the case of children of normal parents than in the children of mentally defective parents. Findings point to the desirability of completing child-bearing before 35 yrs. of age.—*M. W. Kuenzel (in Psychol. Abst.)*.

317. EDWARDS, A. S. Effects of the loss of one hundred hours of sleep. *Amer. Jour. Psychol.* 54: 80-91. 1941.—17 college students (13 men, 4 women) went without sleep for 100 hours. 18 standardized psychological tests (reaction-time, A.C.E. psychological examination, tapping, visual acuity, color zones, hand steadiness, memory, etc.) and 6 measures of physiological functioning (blood pressure, temperature, patellar reflex, etc.) were given before and after, as well as during the sleepless period. 10 control S's also took the tests. Results obtained corroborate those of earlier investigators. Physiological functioning appeared unaffected. In the psychological tests some S's maintained the level of their performance, even after 72 or 96 hours without sleep, but at the expense of tremendous effort. Static ataxia increased for most S's and showed large and definite effects of loss of sleep. From 11-30 abnormal symptoms (dizziness, inattention, hallucinations, headache, etc.) appeared in all S's. Women did as well as the men. In general, the stronger

and more athletic men suffered the most.—*D. E. Johannsen (in Psychol. Abst.)*.

318. GREENE, J. E., and W. S. PHILLIPS. Racial and regional differences in standard therapy rates among white and negro mental patients. *Human Biol.* 11(4): 513-528. 1939.—7 separate clinical categories of mental disorders were utilized as bases of the following inter-racial and inter-area comparisons: (a) standard "recovery" rate; (b) standard "improvement" rate; (c) standard "unimprovement" rate. The inter-racial comparisons were based on (a) U. S. whites vs. U. S. Negroes; (b) Georgia whites vs. Georgia Negroes. Despite certain conflicting trends in the data, a few general conclusions appear to be warranted. Racial differences in standard therapy rates are found to exist both in Georgia and in the United States. These racial differences are generally larger and more reliable in the Georgia comparisons than in the United States comparisons. In both Georgia and the U. S. the differences which are most favorable to the Negroes are those based on "unimprovement" rates. Regional differences in standard therapy rates are found among both whites and Negroes. In general, Georgia whites compare more favorably with U. S. whites than do Georgia Negroes with U. S. Negroes. The racial and regional differences vary from one disorder to another and from one standard rate to another.—*Authors*.

319. HARTSON, LOUIS D. Marriage record of alumnae for the first century of a coeducational college. *Jour. Heredity* 31(9): 403-406. 1940.—During the first 60 yrs. there was a steady decline in the marriage rate of alumnae of Oberlin College, from almost 100% to 58%; but for those who graduated between 1907 and 1926 the proportion has risen to 65%. The lowest record was that of the class of 1899, of whose women members only 45.3% have married. The need for new psychological approaches and the development of new social trends to improve the quality and maintain the numerical strength of the population are emphasized.—*L. M. Dickerson*.

320. HOLLINGSHEAD, A. B. (Indiana U.) Human ecology and human society. *Ecol. Monogr.* 10(3): 354-366. 1940.—The chief contributions to human ecology from 1912 to 1939 are noted and classified. During this period human ecology has emerged as a new borderline discipline partly dependent upon both the biological and social sciences. The contributions of each group to the terminology, theory, and focus of human ecology are sketched. As a science human ecology is faced with discovering the interrelations between Man as an organism and Man as a creature of society. Sociologists and ecologists have found human society to be organized on 3 levels: the ecological, moral and institutional. The ecological level is characterized by competitive interaction comparable to what is observed in the world of plant and animal symbiosis, but always more or less limited by culture; the informal order of moral organization is rooted in interpersonal obligations that arise as a result of communication; in the sphere of institutional organization formal social restraints define and limit social behavior. The task of human ecology is limited to interrelations between the social and ecological orders in so far as they influence behavior.—*A. B. Hollingshead*.

321. HOLMES, S. J. The ethics of enmity in social evolution. *Amer. Nat.* 74(754): 409-417. 1940.—In man, as in the animals generally, the attitude and behavior of the individual—e.g., cooperation in chase, predation, enmity—differ (a) within the species vs. between spp., and (b) within the aggregation (pack, clan) vs. members of other aggregations. Man's two moral codes (Spencer)—one for consociates and the other for aliens—is a special case under this general principle. Only certain Hindu sects attempt to extend the ethics of amity to all living creatures. Most inhabitants of Christian countries, though professing an ethics based exclusively on amity, really practice the ethics of enmity on occasion and justify their procedure in various ways. There is much confusion over the place which the ethics of enmity should occupy in our conduct. We would be gainers if we faced the problem frankly and attempted to define the scope of such an ethics instead of denying its legitimacy in theory and following it in practice.

322. JAFFE, A. J. Differential fertility in the white population in early America. *Jour. Heredity* 31(9): 407-411. 1 fig. 1940.—Birthrate studies in Western Europe and the

beliefs and ascertain the true demographic condition of France; because of his efforts birth, death, and marriage returns began to be compiled on a national scale after 1772. In his first published work (1766) Messance refuted, statistically, the commonly held view that the French population was not growing, and that marriages were less fertile than formerly; he included data on family size, reasoned that celibacy and other factors were not checking population growth appreciably, and contended that pro-populationist legislation exercised little if any influence upon national demographic growth. In a second work (1788) Messance expanded certain of his earlier views, and denied that population growth was appreciably (if at all) checked by luxury, decay of *moeurs*, urbanisation, misery, taxation, military burdens, etc.; he reasoned that population tends to growth as long as employment and subsistence are easily attainable. Recognizing that heavy industry and national power were founded upon coal supplies, he urged their conservation. Although a defender of economic *laissez faire*, he reasoned that since the life of the state so greatly exceeded that of any individual, the government had the right to intervene to conserve resources—a proposition defended in recent years by exponents of *étaisement*.—J. J. Spengler.

342. STRATTON, G. M., and F. M. HENRY. Mongolians and Caucasians: their physiological reactions to emotional stimulus. *Psychol. Bull.* 35: 695. 1938.

343. TOMASZEWSKI, W. Puls- und Atmungsfrequenz unter psychischer Beeinflussung. *Zeitschr. Kreislauforsch.* 29: 745-753. 1937.—The frequency of pulse beat and breathing were detd. in 54 subjects under 12 different conditions, including mental work, emotional excitement, fearful expectation, etc. Sorrow and sad ideas decreased these frequencies, and they were increased by mental work, fright, joy, and expectation. Individual differences were great, and an after-effect was frequently observed.—P. L. Krieger (*in Psychol. Abstr.*).

344. VARIOUS AUTHORS. I. Théorie générale de la population. *Actualités Scientifiques et Industrielles* 710. 1-270. Hermann et Cie: Paris, 1938.—Papers read at the Congress International de la population, Paris, 1937, on various problems of demography in various countries: statistical methods, population growth, death rate, emigration, and economic and political problems.—R. J. Main.

345. VILLAR SALINAS, J. Distribución por edades de la población de España. [Age distribution of the Spanish population.] *Rev. Sanidad e Hig. Publ.* 13(8): 493-505. 1939.—The principal errors in establishing the age distribution in Spain arise of the tendency to consider only uncorrected figures. A correction factor such as that of Woodhouse should be used. At present the population of Spain shows a structure of a Lünd-Bürg type of a pyramidal Burgdörfer shape.—Since the 18th century the proportion of persons over 50 yrs. of age has been increasing; the Spanish population is passing into the stationary phase already reached in other European countries.—O. Fernandez.

346. WEISS, MYRON. Harvard success and parenthood. *Jour. Heredity* 31(9): 388. 1940.—Statistics on the Harvard College class of 1915 show that among the 600 survivors, the class average is 1.9 children. Of 50 who have received public recognition of achievement the average is 2.2. The av. for productive marriages is 3.2. Of these 50, 24 migrated westward from their birthplaces to achieve success; 7 went eastward; and 19 flourish near their birthplaces.—L. M. Dickerson.

347. WENDLER, A. J. A critical analysis of test elements used in physical education. *Res. Quart. Amer. Assoc. Health Physic. Educ.* 9(1): 64-76. 1938.—Using Thurstone's simplified multiple-factor method, 40 tests commonly employed in physical education were analyzed for their common and group components. 4 underlying common factors were identified: strength, velocity or speed of movement, motor educability, and sensori-motor co-ordination. Combinations of items were set up which correlated well with each of the first 3 factors.—F. W. Finger (*in Psychol. Abstr.*).

348. WHELTON, P. K., and NELLE E. JACKSON. Prolificacy distribution of white wives according to fertility tables for the registration area. *Human Biol.* 12(1): 35-58. 1940.—Corrections in method and adjustments of

basic data are suggested for computing the prolificacy distribution of white wives in a cohort exposed continually to specific birth, death, marriage, divorce and widowhood rates of a base period. Allowing for incomplete birth registration, distributing illegitimate births by estimated order of birth instead of assuming all to be first births, partially adjusting births for misstatements of legitimacy and order, using the marital distribution of the Birth Registration Area instead of the U. S., and using the 3-yr. period 1919-21 (or 7-yr. period 1917-23) instead of the somewhat abnormal single year 1919, changes the % of wives childless and fertile from 17.8 and 82.2 respectively as computed by Lotka to 12 and 88. For wives with unbroken marriages the change in percentages is from 12.6 and 87.4 to 6.9 and 93.1. An original method is described for computing corresponding percentages for wives marrying under age 45, the 1919-21 percentages being 10.3 and 89.7 for all such wives and 5.1 and 94.9 for those with unbroken marriages. The prolificacy distribution of white wives according to 1929-31 rates is contrasted with that according to 1919-21 rates, the % infertile increasing greatly, the % with 1 or 2 births changing but little, and the % with 3 or more births decreasing, the extent of the decrease varying directly and greatly with the number of births. The limitations of prolificacy distribution tables are discussed, particularly the effect of birth rates in yrs. prior to a base period, of long time changes in the extent and effectiveness of contraceptive practices, and of factors like depression and war which may make the base period abnormal.—Authors.

349. WHITNEY, JESSAMINE S. (edited by). Effect of tuberculosis on size of family. *Amer. Rev. Tuberc.* 41(2): 267-271. 1940.—*Effect of Tuberculosis on Size of Family*:—This is an abstract of a study by Jean Downes (The Effect of Tuberculosis on the Size of Family—The Milbank Memorial Fund Quarterly, July, 1939) in which it is concluded that "the tendency of the tuberculous family unit to be eliminated more rapidly through a somewhat lower fertility operating in conjunction with an excessively high mortality among offspring has probably been a factor contributing to the decline in the tuberculosis death rate which has been occurring over a long period of years."—*Tuberculosis and Pregnancy*:—Three reports are abstracted. Data from the Bureau of the Census on an analysis of all deaths in the U. S. for 1936 showed that 60% of all death certificates reported more than one cause of death. Among a total of 13675 deaths in puerperal conditions for 1936, 170 or 1.2% reported tuberculosis as the cause of death. Other subjects in which statistical data are presented include: "Puerto Rico's Tuberculosis Death Rate"; "Decline in Tuberculosis Death Rate in Sweden"; "Recent Data on Tuberculosis in England and Wales"; and "Duration of Illness in Tuberculosis Patients Prior to First Examination by Tuberculosis Officer (England)."—W. H. Feldman.

350. WILD, M. R. The behavior pattern of throwing and some observations concerning its course of development in children. *Res. Quart. Amer. Assoc. Health Physic. Educ.* 9(3): 20-24. 1938.—The basic pattern of throwing depends upon a co-ordination of neuromuscular powers, such as equilibration and orientation, and a highly sensitive proprioceptive mechanism. As the basic patterns develop, maturational factors are believed to be operative; individuation (including sex differences) seems to depend on learning, particularly that which occurs after 6 yrs. of age.—F. W. Finger (*in Psychol. Abstr.*).

351. WILLOUGHBEY, R. R., and MARGUERITE COOGAN. The correlation between intelligence and fertility. *Human Biol.* 12(1): 114-119. 1940.—143 ♂♂ and 230 ♀♀ (all that could be followed, with adequate records, of the Providence high-school graduating classes of 1926) had by the end of 1938 produced 62 and 125 children respectively. The reproductivities of the upper and lower halves of the intelligence-score distributions are not significantly different in either sex; however, a negative correlation is present between test score and sibling number, as in the classical studies. There is also the traditional negative correlation (for the ♂♂ only) between occupation and further education on the one hand and number of offspring on the other. It is concluded that the widely assumed negative correlation

between intelligence and fertility does not exist, but has been erroneously inferred from the fact of negative correlation between intelligence and number of siblings.—*R. R. Willoughby.*

352. WOODRING, PAUL D. A technique for the investigation of direction orientation in human beings. *Papers Michigan Acad. Sci., Arts and Lett.* 24: Pt. IV. 147-152. 1938 (1939).—This paper is a report of tentative findings in a research project still in progress. 75 white and 21 Negro subjects were instructed to indicate on a 5-inch circle the direction of various designated points familiar to the subjects but not visible from their location. The points ranged from objects just outside the room to distant cities. The distribution of av. errors was distinctly bimodal, with a range from 10° to 174°. No significant correlations were found with age or sex. The Negroes were found to be slightly superior to the whites.—*P. D. Woodring.*

353. ZINGG, R. M. Feral man and extreme cases of isolation. *Amer. Jour. Psychol.* 53: 487-517. 1940.—The concept of feral man (individuals who either grow up with wild animals or live in extreme isolation) was introduced by Buffon about 1750, and into organized science by

Linnaeus in 1758. Due to the use made of the idea by Rousseau, it fell into disrepute. The author evaluates the adequacy of the information on a large number of such cases, classifying them into: (1) those who have wandered away and survived in the wild by their own efforts, and (2) those who were cared for by animals. Not strictly feral are the cases of children shut away from human society by cruel or insane parents. In tabular form data on 31 authentic cases of varying degrees of wildness are given. The author summarizes the evidence and concludes that despite the possession of normal sensory and intellectual equipment (in most cases) the characteristic human behavior patterns, not only in the linguistic field, but also in the emotional and perceptual fields, fail to develop. The extent to which such children can acquire typically human ways of walking, eating, dressing, etc. depends on the duration of their isolation from human society and on whether they have strongly ingrained patterns of animal behavior to unlearn. The evidence indicates that "mentality is a bioun neurological mechanism, and mind is the environmentally conditioned content organized by that mechanism."—*D. E. Johannsen (in Psychol. Abst.).*



ECOLOGY

Editors

ORLANDO PARK, *General Animal Ecology*G. D. FULLER, *General Plant Ecology*CHANCEY JUDAY, *Hydrobiology (Oceanography, Limnology)*FREDERICK A. DAVIDSON, *Ecology of Wildlife Management—Aquatic*
W. L. McATEE, *Ecology of Wildlife Management—Terrestrial*ROBERT G. STONE, *Bioclimatology, Biometeorology*

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354. ALLRED, B. W. (*Soil Conserv. Serv., Lincoln, Nebr.*) Grasshoppers and their effect on sagebrush on the Little Powder River in Wyoming and Montana. *Ecology* 22(4): 387-392. 3 fig. 1941.—The collaboration of heavy grasshopper infestations with the severe droughts of 1934 and 1936 brought about a 50% loss in big sagebrush (*Artemesia tridentata*) on the Little Powder River in Wyoming and Montana. Only 15% losses of the same plant were found a short distance south of here between Gillette and Moorcroft, Wyoming, where the drought was the same but the grasshopper infestations much lighter than those on the Little Powder River. In general, the sagebrush losses on the Little Powder River were lighter on areas with higher moisture values such as found on north slopes, sandy soils, or floodplains.—B. W. Allred.

355. CURTIS, JAMES D. (*U. Maine.*) The silvicultural significance of the porcupine. *Jour. Forest.* 39(7): 583-594. 4 fig. 1941.—At Mt. Toby, Mass., a 5-acre tract bisected by a rock ledge containing a number of porcupine (*Erethizon* sp.) was studied intensively to determine the effect of feeding on a young hardwood stand in central New England. Hemlock (*Tsuga canadensis*), sugar maple (*Acer saccharum*), and basswood (*Tilia glabra*) were the most heavily used as food, followed by black birch (*Betula lenta*), paper birch (*B. papyrifera*), and striped maple (*A. pennsylvanicum*). The kind of feeding depends largely on the species. Although damage to some trees was severe, damage to the stand as a whole was not serious. Since the porcupine may feed heavily on valuable forest trees, a revised silvicultural system may be

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necessary in stands where porcupines are numerous.—S. H. Spurr.

356. GOETSCH, W., und R. STOPPEL. Die Pilze der Blattschneiderameisen. *Biol. Zentralbl.* 60(7/8): 393-398. 1940.—Fungi recovered in artificial culture from the gardens of *Atta sexdens* and *Acromyrmex stratus* indicate that the commonly cultivated fungi are *Hypomyces*, *Actinomucor* and *Fusarium*. Some others, such as *Penicillium*, *Verticillium*, *Rhizopus* are perhaps "weeds." Carefully bathed ants (*Acromyrmex*) were housed in previously sterilized gypsum nests and supplied with mixed cultures. Finally, after many different devices were tried on them, they built up fungi gardens from which *Hypomyces* and *Actinomucor* were regularly recovered.—A. H. Hersh.

357. PIJL, L. van der. Houtbijbloemen bij *Costus*, *Bauhinia*, *Centrosema* en *Thunbergia*. [Timber-bee flowers of *Costus*, *Bauhinia*, *Centrosema* and *Thunbergia*.] *Trop. Natur* 30(1): 5-14. 1941.—Spp. of *Xylocopa*, timber bees, especially *X. latipes*, *X. confusa*, and *X. coerulea* are important pollinators in some parts of Java. The pollination of *Costus speciosus*, *Bauhinia purpurea*, *Alpinia malaccensis*, *Centrosema plumieri* and *Thunbergia grandiflora* is descr. in detail.—J. C. Th. Uphof.

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358. BROOKS, C. F. Further experience with shielded precipitation gages on Blue Hill and Mt. Washington. *Trans. Amer. Geophys. Union* 1940(2): 482-485. 1940.—Nipher shield is best. Refs.—R. G. Stone.

359. BROWN, KENNETH C., and FREDERIC J. WEYHER (Patented by). Apparatus for controlling the humidity of spaces. U. S. 2,234,858, March 11, 1941 (assigned to Weyher to Kenneth C. Brown).—App. is described, involving use of a humidity responsive element comprising a cotton wick which has been impregnated with a salt soln. including NaCl and dried, a plurality of Pt wire electrodes attached to the impregnated wick in spaced relation therewith and arranged to be connected externally to an elec. circuit, the wick being freely exposed to the atm. in a space wherein the elec. cond. of the impregnated wick between the electrodes varies in accordance with the humidity of the atm. —Courtesy *Chem. Abst.*

360. DINGLE, HERBERT, and A. W. PRYCE. (*Imp. Coll. Sci. and Tech.*) The estimation of small quantities of carbon dioxide in air by the absorption of infra-red radiation. *Proc. Roy. Soc. Ser. B: Biol. Sci.* 129(857): 468-474. 4 fig. 1940.—This paper describes an investigation of the possibility of measuring small amts. of CO₂ in air by the absorption of infra-red radiation. The method is shown to be simple, trustworthy and accurate, and very sensitive for small amts. of CO₂, of the order of that present in ordinary air. The principle is applied in a form superior to any hitherto used, in that the whole of the transmitted radiation is measured instead of merely the radiation at the maximum of a particular absorption band. This makes a spectrometer unnecessary, eliminates the disturbing effect of variation of temp., and allows much less sensitive detecting apparatus to be used. The only preliminary treatment necessary is the removal of water vapor from the air under examination.—Auth. abst.

361. EISENTRAUT, M. Vom Wärmeaushalt tropischer Chiropteren. *Biol. Zentralbl.* 60(3/4): 199-209. 1 fig. 1940.—An investigation of tropical bats in their native habitat in Cameroon, on the journey north to Germany and in Germany, showed that they are similar to native bats of the temperate zone in regard to the primitive character of their temp. regulation, but differed in having a lower threshold of waking temp. (about 32° instead of 35°), and a wider zone for the waking temp. (about 7° instead of 3°); daytime lethargy occurred at about 24° instead of about 28°; enduring lethargy commenced at 20° instead of 10°; death occurred after long maintenance at 8° instead of -5°. Tropical bats are essentially cold-blooded animals below 25°, native bats below 28°.—A. H. Hersh.

362. GANE, R. The dielectric properties of prepared pig-gut at different water contents. [*Gr. Brit. Dept. Sci. and Indust. Res. Ann. Rept. Food Invest. Bd.* 1938: 243-244. 1939.—The capacity of a condenser with prep'd. pig-gut as the dielectric was measured at different humidities, with the object of making a distant-reading hygrometer.—C. Alexander.

363. GRIFFITHS, E., J. H. AWBERY, and R. W. POWELL. Work carried out at the National Physical Laboratory. [*Gr. Brit. Dept. Sci. and Indust. Res. Ann. Rept. Food Invest. Bd.* 1938: 265-274. 1939.—A report of investigations on (1) the relation between rate of evaporation and nature of air flow over a surface (including the effect of ridges), (2) the influence of films on the surface on evaporation from water, (3) determination of the diffusion of water vapor in air, and (4) physical properties of refrigerants (ethyl chloride, methyl chloride and dichlorodifluoromethane).—C. Alexander.

364. GRUNOW, JOHANNES. *Wetter und Klima. Ihr Wirken und ihre Beziehungen zur lebenden Welt.* 319p. Map, illus. Wegweiser Verlag: Berlin, 1937.—Not since von Ficker's "Wetter und Wetterentwicklung" have we seen such an excellent elementary book on weather and climate for the general reader. The author is an active research official of the German weather service and brings a wide acquaintance with the full scope of modern meteorology and climatology into one focus. The arrangement is logical; the style clear, neither overpopular nor too technical, and the naivetes and inaccuracies of so many books of this sort are largely absent. The variety and comprehensiveness of subject matter is unbelievable, with many items rarely mentioned in English works of this sort. Physical aspects are emphasized.—R. G. Stone.

365. HAND, IRVING, F. (*Weather Bureau, Washington.*) An instrument for the spectroscopic determination of precipitable atmospheric water vapor, and its calibration. *Month. Weather Rev. U. S. Dept. Agric.* 68(4): 95-98. 2 pl., 1 fig. 1940.—The use of a specially constructed spectroscope with collimator lens and a 60° prism in a Littrow mounting pointed towards the sun for the measurement of the differential in the solar energy at the rho water-vapor absorption band (0.935μ) and the crest immediately adjoining this band (0.956μ) permits the determination of the amt. of precipitable water in a vertical column over the observer. The chief advantages of the new instrument consist of the rapidity of observation, in the elimination of many of the assumptions and calculations necessary in previous methods and the greatly increased degree of accuracy. The chief disadvantages are the high cost of the instrument and the need of highly trained personnel in its operation.—I. F. Hand.

366. HEADLEE, THOMAS J. (*New Jersey Agric. Exp. Sta., New Brunswick, N. J.*) Further studies of the relative effects on insect metabolism of temperatures derived from constant and variable sources. *Jour. Econ. Ent.* 34(2): 171-174. 1941.—Studies of the relative effects of constant and variable temps. on insect metabolism, dealing in particular with *Aedes aegypti*, confirm the conclusion that the relative effect on insect metabolism of temps. drawn from variable and from constant sources is dependent upon where, in the gamut of the insect's normal temp. reaction, these constant and variable temps. lie. The underlying and governing factor of such differences as exist in the variable and constant temps. is the accumulation of the required amt. of heat, regardless of whether the temps. in question come from constant or variable sources.—T. J. Headlee.

367. JACOBS, WOODROW C. (*Weather Bureau, Pomona, Cal.*) Applications of Brunt's radiation equation to minimum temperature forecasting. *Month. Weather Rev. U. S. Dept. Agric.* 67(12): 439-443. 1939(1940).—Brunt's radiation equation, which allows the computation of the rate of radiational cooling of any surface as a function of temp., time and radiation from the sky, can also be applied to forecasting minimum air temps. with a fair degree of accuracy. The formula:

$$T_{\min} = T_0 - 12.1 (0.56 - 0.08 \sqrt{e}) \sqrt{t}$$

(where T_0 is the air temp. at sunset; e is vapor pressure in mb.; and t is the length of night in hrs.) was applied in forecasting the minimum temps. on all frost nights during

the 1937-38 winter season at the Riverside and El Centro, Calif., Weather Bureau temp. survey stations. The computed values were somewhat lower than the observed but the differences could be accounted for by considering the effects of wind, cloudiness and local changes in humidity. Semi-quantitative methods were introduced for dealing with these latter factors.—W. C. Jacobs.

368. KITTREDGE, JOSEPH. Report of committee on evaporation and transpiration 1939-40. *Trans. Amer. Geophys. Union* 1940(2): 406-409. 1940.—A review of recent developments and new projects, with bibliography.—R. G. Stone.

369. KNAPP, GEORGE S. Water resources of the mid-continent area. *Civil Engineering* 10(10): 653-655. 1940.—Records show long-continued increase in average temp., decrease in rainfall, leading to increase in evap., and decrease in runoff. The area considered lies between the humid eastern and arid western parts of the U.S.—R. G. Stone.

370. KNOBLAUCH, H. C., and J. L. HAYNES. Run off under different systems of grassland management. *Soil Conserv. U. S. Dept. Agric.* 5(10): 256-258. 1940.

371. KRAEBEL, C. J., and J. D. SINCLAIR. The San Dimas Experimental Forest. *Trans. Amer. Geophys. Union* 1940(1): 84-92. 1940.—Description of watersheds in the forest, precip. gages, stream gages, climat. stations, plots for runoff-erosion study, lysimeters and results.—R. G. Stone.

372. PEDERSEN, CLARENCE. Discussion of C. W. Windling's paper "Do climatological averages serve adequately as normals?" (Bull. Amer. Met. Soc., Jan. 1940, p.3.) *Trans. Amer. Geophys. Union* 1940(3): 1046-1050. 1940.—The arithmetical average fails to give representative value for monthly normals of snowfall and rainfall but serves well for temp. normals.—R. G. Stone.

373. POMERENE, W. H. Instruments for hydrologic research. *Agric. Engineering* 21(3): 102. 1940.—An indexed list of over 200 diff. instruments made by 60 mfgrs. has been made and may be obtained in mimeo. at 20 cents from Secy. Amer. Soc. Agric. Eng., St. Joseph, Michigan.—R. G. Stone.

374. RIESBOL, H. S. Report on exploratory study of raingage shields and enclosures at Coshocton, Ohio. *Trans. Amer. Geophys. Union* 1940(2): 474-482. 1940.—(See previous art.; *Ibid.* 1938, p.542-559.) Comparative data for catches by gages with various forms of shields and enclosures; detailed descr.; refs.—R. G. Stone.

375. ROHMER, CARL. The present trend in evaporation experiments. *Univ. Iowa Stud. in Engineer. Bull.* 20. 81-91. 1940.

376. SAPSFORD, H. B. (*Apia Observatory, Samoa*) Exposure of thermometers in Samoa. *New Zealand Jour. and Sci. Tech.* 22(3B): 136B-143B. 2 fig. 1940.—A comparison is made between 2 thermometer screens at Apia, the "Tropical Screen," a louvred screen erected under an auxiliary thatched structure; and the Stevenson screen which has no shelter. The comparison which extends over a period of 7 yrs. shows that there is only a small difference in recorded temp. and that there would be an even smaller difference at night if the screens were at the same height. The additional protection in the case of the Tropical screen is considered a slight advantage under average conditions in Samoa.—L. C. Olson.

377. SPRAGUE, V. G., and E. M. WILLIAMS. An inexpensive integrating light recorder. *Plant Physiol.* 16(3): 629-635. 1941.—The construction and operation of the apparatus is described for use on 110-V, 60-cycle current. In operation, light striking the light-sensitive element in a vacuum phototube causes a current to flow which is very closely proportional to the intensity of the light. This current charges a condenser which, when it reaches a critical potential, discharges through a cold cathode gas discharge relay tube. This, in turn, discharges a 2d condenser which operates a sensitive counter. Thus, by calibration, the av. intensity or integrated light during any time interval can be measured. Unless used with monochromatic light or light of constant quality, the results are available only in arbitrary units, such as foot-candle-hrs. Light intensities below 1 ft.-candle have been measured. The low cost (less than \$25) of the apparatus, its simplicity of operation,

and its probable long life enhances its usefulness for measuring light in the various biol. fields. Examples of the variation in sunlight are given for State College, Pa.—V. G. Sprague.

378. STONE, ROBERT G. The distribution of average depth of snow on ground in New York and New England. II. Curves of average depth and variability. *Trans. Amer. Geophys. Union* 1940(2): 672-692. 1940.—Tables of average snow cover depths at 230 stations at 2-week intervals through the season; with curves for each station plotted and classified by types. Types are explained and maps of date of maximum depth and distrib. of curve types are given. A series of expectancy diagrams for 22 stations show the frequency distributions of depths at each date. Other data were given in a previous paper (*Ibid.* 1938, p.486-492). The chief features are: (1) Early seasonal maxima or secondary maxima along the shore of Lake Erie and on ridges or plains some distance back from the shore of L. Ontario. (2) Early and late maxima of the Atlantic coastal margin in N. Y., Long Is., and Conn. (3) Tendency for maxima to occur at a later date at higher altitudes. (4) Actual depths of snow cover at the maxima increase northward and with elevation. (5) Small but definite mid-winter temporary decrease at some valley stations of northern N. Y. and New England. (6) Variability (year to year at same date) is greatest at beginning and end of snow season and where snow cover is normally shallow. (Atlantic coastal margin and Great Lakes shores.)—R. G. Stone.

379. THOM, HERBERT C. S. On statistical analysis of rainfall data. *Trans. Amer. Geophys. Union* 1940(2): 490-499. 1940.—A mathematical discussion, from the probability standpoint, which is by far the most sound of the various recent papers on this aspect. Homogeneity of records, area rainfall-frequency, analysis of data, extrapolation of frequency curves to est. extreme values, etc., are discussed.—R. G. Stone.

380. THORNTHTWAITE, C. W., and B. HOLGMAN. A year of evaporation from a natural land surface. *Trans. Amer. Geophys. Union* 1940(2): 510-511. 1940.—Summary of records of precip., condensation, and evap. at Arlington, Va., by months; illus. exchanges of water-vapor between ground and air, in continental U. S. maritime air masses.—R. G. Stone.

381. WALLACE, RAYMOND H., and RALPH J. BUSHNELL. (*U. Connecticut*) A highly simplified thermionic control of temperature. *Plant Physiol.* 16(3): 647-650. 1941.—A simple and effective temp.-control device is descr. in which the current in the heater circuit passes through a radio tube and is controlled by about 1 microampere grid current in the thermostat circuit. The grid maintains a delicate control of the current in the heater so that the heater itself is as constant in temp. as the air in the chamber being controlled. Air temps. to 0.1° C are easily maintained.—R. H. Wallace.

382. WHITNEY, KENNETH E., and RALPH R. CHAPPELL (Patented by). Apparatus for indicating atmospheric temperature and humidity conditions. U. S. 2,235,954, March 25, 1941 (assigned to Bendix Aviation Corp.)—Various structural, elec. and operative details.—Courtesy Chem. Abst.

ANIMAL

383. ABBOTT, CYRIL E. The sensory basis of courtship. *Jour. New York Ent. Soc.* 49(3): 217-220. 1941.—Courtship is exhibited by diurnal insects and other animals with acute form vision and distinct and highly pigmented body patterns. It is absent in nocturnal forms excepting a few luminescent spp. Apparently courtship is a response evolved from acute visual discrimination.—C. E. Abbott.

384. BISSONNETTE, T. H. (*Trinity Coll., Hartford, Conn.*), and A. G. CSECH (*Farmington, Conn.*). Light-induced egg-production in large pens followed by normal nesting in pheasants. *Jour. Wildlife Management* 5(4): 383-389. 1 pl. 1941.—Mongolian (*Phasianus colchicus mongolicus*), Ring-neck (*P. c. torquatus*), and Black-neck (*P. c. colchicus*) pheasants were night-lighted, Jan. 3-April 25, in pens 12' X 12', without cover, then returned to normal days and cover. Controls, without lights, but with cover throughout, began laying about April 5. Exptl. birds beginning Feb. 20, 19, 13, averaged 0.762, 0.491, 0.525 eggs

per hen-day, respectively, to Apr. 25, with fair fertility. All groups laid eggs in depressions in snow even when birds froze into ice on the floors at night, requiring breaking out next morning. Severe weather reduced laying but did not stop it. Weather is, therefore, a factor in later stages of egg production, not in fundamental activation. On return to normal days and cover, laying was maintained for 7, 9, 7, days, respectively, dropped off temporarily and was resumed at a slower rate. Nests made were 0, 2, 1, as compared with 2, 0, 1, respectively, last year. Mongolians were best layers, most affected by reduced lighting, recovered laying best, but made no nests; ring necks, poorest layers, least affected by reduced lighting, 2d best in recovery, made 2 nests. 8 hens per cock can be lighted effectively in such pens for early eggs, then "planted" in the wild in Apr. with prospects of broods, produced without further cost.—T. H. Bissonnette.

385. CRESPO, JORGE A. Datos referidos a la fauna del altiplano Jujenío. *Rev. Argentina Zool. Geog.* 1(1): 17-25. 2 pl. 1941.—A series of ecological notes on the highlands of the Puna in Jujuy and Salta Provinces, Argentina. The vegetation, of strongly xerophytic species, is of open or discontinuous type. A short series of temperature readings is given. The distribution of a number of birds and mammals is noted, especially around the ponds and marshes. A short bibliography is appended.—A. B. Klots.

386. DICE, LEE R. (U. Michigan.) Methods for estimating populations of mammals. *Jour. Wildlife Management* 5(4): 398-407. 1941.—Counts of the number of wild mammals in a population are usually difficult or impossible to make because the animals are highly mobile, most of them are shy, and many are nocturnal. The estimates of mammalian populations that have been made up to the present time are mostly based on inadequate data and accordingly very few of them are at all accurate. Most of the field methods in use need further refinement and standardization before they will yield satisfactory data in adequate quantity for statistical treatment. For a few kinds of mammals there have been developed indices of abundance that are easier to obtain than are complete censuses, but which for certain practical purposes are nearly as useful.—L. R. Dice.

387. ECK, P. J. van. Farbensehen und Zapfenfunktion bei der Singdrossel, *Turdus e. ericetorum* Turton. *Arch. Néerland. Zool.* 3(4): 450-499. 10 fig. 1939.—The paper method of investigating the color sense is as accurate as other methods and much simpler. It was shown by this method that the song thrush can distinguish the colors red, yellow, green, and blue. Red paper at 0.001 units of light intensity is not more apparently colored than blue paper at 0.075 units. Microscopic examination of retinal sections fixed under various conditions of light intensity shows that layer, form and structure of the light-sensitive elements were different in the dark-adapted than in the light-adapted eye. At the light intensity in which red-discrimination was lost the animal has from the morphological sense a dark-eye and at the intensity in which the red-discrimination is just not yet lost the animal has a bright-eye. The animal is blue-blind at the lowest intensity; the functional transition from the red-efficient phase to the red-blind phase is accomplished rather precisely at the same intensity as the morphological transition from bright-adapted to dark-adapted retina. The functional transition from the blue-efficient phase to the blue-blind falls, on the other hand, at an essentially higher intensity.—P. L. Crummy.

388. KREFTING, LAURITS W., and JACK B. FLETCHER. Notes on the cruising method of censusing white-tailed deer in Oklahoma. *Jour. Wildlife Management* 5(4): 412-415. 1941.—The method employed for censusing white-tailed deer in southeastern Oklahoma was based on the cruising system, first developed by Arnold B. Erickson in St. Croix State Park, Minnesota. Representative sample areas of 4 sq. mi. were chosen and the census lines were run at $\frac{1}{2}$ -mile intervals by the 2 census takers. 2 areas were covered in a day, one in the early morning and the other in the late afternoon. A box compass was used to determine course of direction, and pacing to measure distance traversed. The techniques employed to increase the accuracy of the method were choice of proper weather conditions and manner of covering census lines.

The best practice was to proceed slowly in "hunting fashion," in other words to stalk the deer along the census route just as a hunter might do. The estimate of 3,125 white-tailed deer on 3,500 sq. mi. of range in SE. Oklahoma for March, 1940 is believed to be close to the actual number of the population.—Authors.

389. KUENEN, D. J. Systematical and physiological notes on the brine shrimp, *Artemia*. *Arch. Néerland. Zool.* 3(4): 365-449. 7 fig. 1939.—Animals from California (Marina) and from Italy (Cagliari, Sardinia) were reared in the laboratory from eggs, and fed on a unicellular alga *Dunaliella viridis*, which abounds in most natural brines in which *Artemia* occurs. The data now available in literature and from hybridizing expts. which are described indicate that there are at least 2 spp. in the genus. The refractive index of the blood was detd. as a function of the conc. of the brine. Changes in the osmotic pressure of the blood were detd. as a function of the conc. of the brine also. A comparison of the results of the different methods used indicated that the amts. of water excreted were less than the amts. necessary to increase the conc. of brine to the measured level. This indicates that water can be stored in the animal. The observations on the intestine suggest that it may act as a storage chamber. The rate of defecation is reduced after the animal is transferred to a different conc. Crystals occur in the intestine sometimes, which also indicates an activity in water regulation. Histology of the intestine wall shows a marked activity of the wall after transfer of the animals to other concs. When aquatic animals are transferred to media of different concs., a marked change in respiratory rate is often observable; this may be due to change in water content of tissues or to change in the intensity of osmoregulatory activity. O_2 consumption was greater in the higher concs. of brine; evidently the osmoregulation influences the rate of respiration more than does the water content of the tissues.—P. L. Crummy.

390. MONSON, GALE. The effect of revegetation on the small bird population in Arizona. *Jour. Wildlife Management* 5(4): 395-397. 1 fig. 1941.—A census of small birds on a controlled grazing area and an adjacent uncontrolled area on the Navajo Indian Reservation revealed more than twice as many birds on the former as on the latter, apparently a result of the increase in cover and food on the former area.—Gale Monson.

391. PENNER, LAWRENCE R. (Biol. Res. Inst., San Diego, Calif.) Effects of temperature and moisture on the distribution and incidence of certain parasites. *Ecology* 22(4): 437-447. 1941.—In a symposium discussion of the effects of temp. and moisture on the distr. and incidence of certain parasites the author reviews the importance which these factors play in parasite distr. from an ecological standpoint. The immediate and extended effects of temp. and moisture changes which may lead to profound physiol. readjustment on the part of either host or parasite are discussed from a standpoint of laboratory as well as field procedure. Temp. and moisture may influence the viability and development of eggs and other larval stages of parasites in diverse manner, so that entirely different practices must follow in recommending controls or proper cultural practices. Perhaps one reason why many helminths are so resistant to temp. and moisture changes is because of the normal changes they go through, sometimes more than 60° , to get from host to host. How the factors of temp. and moisture may be used to practical advantage in destroying or preventing certain parasites is elucidated; especially noted are the uses of sharp freezing apparatus in zoological gardens to prevent infections usually obtained through eating parasitized fish or other parasite bearing products.—L. R. Penner.

PLANT

392. ANDERSON, W. A. (U. Iowa.) Spire thickets in conifers. *Ecology* 22(4): 429-430. 2 fig. 1941.—A growth-form in conifers is described in which several trees of the same or of different species group together in a single cone or spire-shaped thicket. These were seen near timberline in Yellowstone National Park.—W. A. Anderson.

393. ÅSLANDER, ALFR. Rödsyran som markindikator. [With Eng. summ.] *Svensk Bot. Tidskr.* 35(2): 219-238.

1941.—The occurrence of sheep sorrel (*Rumex acetosella*) does not indicate lime deficiency or acid soil; it grows on any soil as long as it is not inhibited by the development of more rapidly growing spp.—*Geary Bargström*.

394. BEARD, J. S. (Asst. Conservator of Forests, Trinidad and Tobago.) Soil erosion on the island of Chacachacare, Trinidad, B. W. I. *Caribbean Forester* 2(3): 136-137. 1941.—The topography of the island, and various spp. of plants which are present, are descr. Two valleys suffer from sheet erosion due to overgrazing by domestic fowl which devour green shoots as soon as they appear.—*W. C. Tobie*.

395. BEETLE, ALAN A. Certain North and South American distributions in *Scirpus*. *Madroño* 6(2): 45-49. 1941.—The assumption has frequently been made that species with a similar distribution have had a similar history. In discussing the distribution of *Scirpus* (Cyperaceae) spp. it is further assumed that species with graded distribution patterns may represent different stages of histories that are similar in some respects. The present range of the spp. as compared to a theoretical maximum is taken as an indication of relative age. The significance of distributions, especially where there is duplication over wide areas, is interpreted in the light of dispersal mechanisms—the aquatic habitat being especially significant in *Scirpus*.—*A. A. Beetle*.

396. BILLINGS, W. D. (U. Nevada.) Quantitative correlations between vegetational changes and soil development. *Ecology* 22(4): 448-456. 2 fig. 1941.—The use of quantitative methods in correlating plant succession and soil development is described, and the existing literature reviewed. Linear and curvilinear regression are applied to soil and vegetation data from successional and climax examples in the Piedmont and mountain regions of North Carolina. Using the equation $E = y + (Sxy/Sx^2)(X-x)$, a highly significant coefficient of 0.0212 is shown for the regression of % organic matter in the A₁ horizon on the age of shortleaf pine (*P. echinata*) stands. Highly significant coefficients are also presented for the regression of water-holding capacity, volume-wt., and moisture equivalent of the A₁ horizon on % organic matter in the same soil under shortleaf pine stands. Highly significant regression coefficients showing the relationship of hardwood reproduction under pine to certain soil factors are also presented. The curvilinear relationship between volume-wt. and % organic matter under conditions resulting in high values for the latter factor in a virgin hemlock (*Tsuga canadensis*) stand are brought out by the use of the 2d degree polynomial equation $Y = a + bX + cX^2$ yielding in this case $Y = .6969 - .0121X_1 + .00006X_2$ where Y is equal to the volume-wt.—*W. D. Billings*.

397. BOND, T. E. T. On abnormal flowers of *Primula vulgaris* Huds. grown in Ceylon. *New Phytol.* 40(2): 152-156. 1 fig. 1941.—Phyllody of the calyx and other abnormalities are descr. in flowers of the common primrose (*P. vulgaris*) cultivated in Ceylon at an elevation of 4650 ft. Various possible causes of this condition are discussed in the light of recent literature and the suggestion is made that the abnormality was induced by a change in environment resulting from transfer from a higher elevation, where the mean temp. was slightly lower and where flowering had previously been normal.—*J. R. King*.

398. BÖTTICHER, R., und L. BEHLING. (Bot. Inst., Halle.) Licht, Transpiration, Salzaufnahme und Blattstruktur. Ein Beitrag zur Problem der Sonnen- und Schattenblätter. *Flora* 34(1): 1-44. 13 fig. 1939.—Analysis of typical sun and shade leaves of native trees showed that while still in the bud and up to maturity and autumnal yellowing, on the basis of number of leaves (and also leaf area), the sun-leaves have a higher fresh- and dry wt. and a higher ash content. A greater transfer of nutrients to the sun leaves is thereby established. The strong accelerating effect of the transpiration stream on the absorption of ash substances was shown beyond question in short- and long-period expts. with maize, *Coleus*, and poplar cuttings yet the salt absorption is by no means proportional to the water absorption. The stronger the water stream relatively the less salt it carries with it. Also the cations K and Ca are not equally affected. Ca is decidedly passive. is easily carried along by the water stream and may therefore accumulate in considerable amounts. K is less affected by the water stream. Light is able to accelerate the absorption

of ash materials even without an increase in transpiration whereby K is more greatly affected than Ca. The most important and characteristic part of sunleaf structure is caused by an augmented salt inflow which on its part is promoted decidedly by transpiration and by light (with transpiration excluded). Evidently a definite morphogenetic rôle can not be ascribed to the K:Ca ratio.—*H. F. Bergman*.

399. BRAUN, E. LUCY. (U. Cincinnati.) The differentiation of the deciduous forest of the eastern United States. *Ohio Jour. Sci.* 41(3): 235-241. 1941.—All of the associations of the deciduous forest are genetically related. Within the area of the mixed mesophytic forest, association-segregates suggest the mode of origin of a variety of types from the mixed forest, and demonstrate the relationship of oak-hickory, oak-chestnut, and beech-maple forest to the mixed mesophytic forest. The differentiation which we see today is the result not alone of existing conditions, but also of past history, climatic and physiographic. The more or less gradual change in forest composition, from the area of mixed mesophytic forest outward in all directions, reflects the influence of past and present differences of environment. Transitions between associations are generally gradual, hence boundaries are indistinct. Yet these boundaries may in part be correlated with soil development and the establishment of zonal soil groups; with cycles of erosion; with changes in climate, increasing aridity in the interior and later, glaciation.—*E. L. Braun*.

400. BURNS, PAUL Y. (U. Tulsa.) Ecological studies in an eastern Oklahoma flood plain. *Proc. Oklahoma Acad. Sci.* 21: 49-52. 1941.—A flood plain area surrounding a small stream was selected as a typical example of a common community in northeastern Oklahoma. Belt transects taken to determine the successional relationships showed that *Quercus borealis maxima*, *Carya cordiformis*, and *Juglans nigra* were succeeding *Ulmus americana*, *Fraxinus americana*, and *Celtis* spp. by the stream side; and that *Diospyros virginiana* was invading the prairie grassland. This community, and others of its type in NE. Oklahoma, are evidently expanding and maturing along the water courses and gullies as they are cut back, until eventually the oak-hickory climax is obtained as a dominant cover.—*P. Y. Burns*.

401. CONWAY, V. M. (Westfield Coll., London.) Recent work on Arctic ecology. I. Europe and Greenland. II. North America. III. Arctic ecology (1939-1940). *Chron. Bot.* 6(8): 179-180; 203-204; 228-229. 1941.—I. A brief review of recent papers and a comparison of their results with those of earlier workers—II. The work of Cooper and Polunin is reviewed.—III. A critical study of recent work is given.—*L. J. Gier*.

402. COOKE, WILLIAM BRIDGE. The problem of life zones on Mount Shasta, California. *Madroño* 6(2): 49-55. 1941.—Evidence is given for the occurrence of 3 life zones above the 4000-ft. elevation on Mt. Shasta: Transition, including chaparral and coniferous forest belts; Canadian; and Hudsonian. Absence of a permanent snow line and of plant indicators argues that, contrary to an earlier postulate by Merriam, the Arctic-Alpine zone is not represented.—*Ethel Crum*.

403. DAUBENMIRE, R. F. (U. Idaho.) Some ecological features of the subterranean organs of alpine plants. *Ecology* 22(4): 370-378. 24 fig. 1941.—A macroscopic and histologic study was made of the subterranean organs of 24 spp. of dicotyledonous alpine plants of Wyoming. Most of these plants tend to proliferate near the soil surface to form a more or less compact cluster of aerial shoots. The av. depth of penetration of the root systems is about 25 cm. Subterranean storage tissues are not especially well developed. Instances of root contraction in *Ryderbergia grandiflora*, and of apparently vestigial hydrophytic structure in *Erigeron pinnatisectus* were noted. Endotrophic mycorrhizae were found in *E. compositus*, *E. pinnatisectus*, and *Polygonum vivparum*.—*R. F. Daubenmire*.

404. DOLUKHANOV, A. (Forests of the basin of the Tchkhalta river (Abkhasia).) [With Eng. summ.] *Trudy Tbiliss. Botanichesk. Inst. (Tav. Inst. Bot. Tbilissi)* (Tiflis) 5: 1-103. Illus. 1938.—The Tchkhalta R. (basin of the Kodor R. in Abkhasia) runs along a narrow deep gorge at the southern foot-hills of the Main Caucasian Ridge. The slopes of the gorge from 500-600 m. up to 2000-2300 m. above

sea level, are covered with virgin forests. In the 600-1050 m. zone beech forests predominate; up to 700-800 m. they are intermingled with fragments of hornbeam, chestnut and other woods with predominance of broad-leaved trees; still higher, beech forests grow almost unmixed. Within the limits from 1050-1950 m. beech forests shelter a considerable amount of spruce which in some places even predominates. The zone between 800 and 1600 m. offers optimal conditions for the development of forests. Above 1950 m. the fir-tree disappears almost entirely and the beech grows as low subalpine brushwood up to 2100-2150 m. Above this region there occur only single curtains of shrubbery of *Betula pubescens* with admixture of *Sorbus aucuparia*, in some places *Acer trautvetteri*, *Quercus ponticus* and others. These curtains are disseminated in single spots among subalpine meadows, fragments of the *Rhododendron caucasicum* formation, subalpine high grass and fern thickets. Alder groves are found in some places. From the standpoint of national economy the virgin different-aged beech and especially mixed beech and fir forests are most valuable. The height of the firs reaches 50-55 m. (more often 45-48 m.), and that of the beech 38-40 m. There exists a close correlation between the natural forest regeneration and the whole dynamics of the development of the censuses, on the one hand, and the forest types on the other. Associations are divided into types having a colchide shrubby undergrowth and types devoid of it. The latter contain a dry type with poor grass-covering and a vigorous natural forest regeneration; a fresh type with good covering and average conditions of forest regeneration; and a humid type with thick grass covering (chiefly ferns) and very bad conditions of forest regeneration. Among forest types with colchide underwood relatively good conditions of natural regeneration occur where the young growth consists of *Ilex aquifolium*, slightly poorer types with *Vaccinium arctostaphylos* as young growth, and very poor in those with *Laurocerasus officinalis* and *Rhododendron ponticum*.—From Eng. summ. by Freeman Weiss.

405. FEATHERLY, H. I. (Oklahoma A. and M.) Silting and forest succession on Deep Fork in Southwestern Creek County in Oklahoma. *Proc. Oklahoma Acad. Sci.* 21: 63-64. 1941.—The deposition of silt and the rise of the water table completely destroyed an oak-hickory forest on the well-drained flood plain of Deep Fork river. This area is now occupied largely by an ash-cottonwood-willow forest on a new surface, with a shallow water table.—H. I. Feathery.

406. FEATHERLY, H. I. (Oklahoma A. and M.) The effect of grapevines on trees. *Proc. Oklahoma Acad. Sci.* 21: 61-62. 1941.—Grapevines and trees grow well together until the tree reaches maturity and slows up height growth. The grapevine then spreads out over the canopy and reduces the light reaching the tree. The light is sometimes reduced to a critical point.—H. I. Feathery.

407. FICK, J. C. (Div. Soil and Veld Conserv., Dept. Agric. and Forest., Union S. Africa.) Erosion and how it is effected by the disturbance of natural balances. *Farming in S. Africa* 15(184): 227-228. 1941.—The pioneers of S. Africa found rich grazing lands and large areas suitable for cultivation. There existed a dynamic equilibrium between rainfall, soil formation, and plant life, which equilibrium was disturbed by the rapid extension of cultivated lands and the intensive grazing of the veld. This resulted in soil erosion, exhaustion of soil fertility and depletion of the grazing lands. Many farms were abandoned and many more will be unless protective measures are taken.—K. L. Anderson.

408. GODWIN, H. Studies of the post-glacial history of British vegetation. IV. Correlations in the Somerset Levels. *New Phytol.* 40(2): 108-132. 8 fig. 1941.—This paper reports the outcome of preliminary investigations of the post-glacial deposits of the Somerset levels. Shapwick and Meare Heaths are shown to be relict raised-bogs developed over a semi-marine clay, the surface of which now lies at approx. +5 ft. O.D. The ombrogenous peat of these bogs shows a strong division into a lower well-humified *Sphagnum-Calluna-Eriophorum* peat and an upper fresh-*Sphagnum-Molinia* peat. A series of archaeological discoveries in the peat of these heaths, allows a rough dating of this Boundary Horizon and establishes a correlation with pollen diagrams made at each discovery site.

Peat formation in these mires began in an alder-mixed-oak forest stage including remarkably high values for elm pollen, and continued until late Roman times. When the upper layers are still present, as at Shapwick, they show the pollen composition typical of the above stage in which reverte in forest history is indicated by increase in *Betula* and virtual disappearance of *Tilia*; a small amt. of *Fagus* is also present. The east Lake Village at Meare rests on a thin layer of raised-bog peat. The pollen diagrams reveal a drift of forest history quite conformable with that for the country as a whole, and the stratigraphic data reinforce the view that the structure and development of the region are very similar in principle to those recognized in the East Anglian Fenland.—J. R. King.

409. GOULD, FRANK W. (U. California, Berkeley.) Plant indicators of original Wisconsin prairies. *Ecology* 22 (4): 427-429. 2 fig. 1941.—A recent study of the prairie flora of Dane County, in southern Wisconsin, disclosed that *Silphium laciniatum* and *Eryngium yuccaeolium* are excellent indicators of original prairie regions. Of 171 locations in which one or both of these spp. were recorded, only 7 were outside of mapped prairie areas.—F. W. Gould.

410. GRAHAM, SAMUEL A. (U. Michigan.) Climax forests of the Upper Peninsula of Michigan. *Ecology* 22 (4): 355-362. 6 fig. 1941.—The hemlock-hardwood forests on the better soils of western Upper Michigan on the whole do not represent a true climax type, if by climax is meant some type of biota capable of reproducing itself generation after generation on the same area. The 2 essentials demanded of a climax species are: (1) a high degree of tolerance, (2) the ability to reproduce itself in spite of a deep layer of duff and litter covering the mineral soil. Hemlock, sugar maple, basswood, and balsam fir are the only trees present in the areas studied that meet these requirements. Neither yellow birch nor white pine qualifies as a climax species. Reconstruction of the forest as it was 50 yrs. ago from data collected on sample plots, together with other data, indicates the probable course of succession following a severe burn several hundred yrs. ago: (a) aspen invaded the burn; (b) white pine, yellow birch, hemlock, and sugar maple became established and replaced the aspen; (c) decadence of the original invaders probably led to decrease of yellow birch and an increase of hemlock and sugar maple; (d) the pine, even though not cut, would eventually die, leaving a mixed hemlock-hardwood forest; (e) this mixture would tend more and more toward a hemlock-sugar maple-basswood forest, the ultimate hypothetical climax. It is suggested that the establishment of the ultimate climax over extensive areas may be prevented normally by the action of wind, fire, fungi, and insects.—S. A. Graham.

411. HORTON, JEROME S. (California Forest and Range Exp. Sta.) The sample plot as a method of quantitative analysis of chaparral vegetation in southern California. *Ecology* 22(4): 457-468. 1941.—In order to analyze quantitatively the density of vegetation occurring on a series of small chaparral-covered watersheds, 225 random milacre quadrats were measured. Data were segregated to show vegetative composition of the associations and the several watersheds. In a check of the reliability of sampling, the frequency distributions of the densities of the various spp. found on the quadrats were not statistical normal curves. Chamise-chaparral was selected as the association to determine the desirability of enlarging the plot size to allow for increased statistical analysis. 80 of the quadrats occurring in the chamise-chaparral were enlarged to an 8-milacre size. This increased size produced normal frequency curves for the 2 dominants, *Adenostoma fasciculatum* and *Ceanothus crassifolius*. Further study showed that an analysis of the % of open area gave a more sensitive indication of reliability of sampling and could therefore be used in detn. of the number of plots needed to obtain a desired accuracy. As the frequency distribution of this factor of openness was normal in both the 1-milacre and 8-milacre sized plots, there was little advantage obtained in utilizing the larger plot.—J. S. Horton.

412. TANISHEVSKII, D. E. (The extrafloral nectar-glands of *Salix*.) [In Russ. with Eng. summ.] *Trudy Bot. Inst. Akad. Nauk SSSR Ser. 4 Eksperimental'naya Botanika (Acta Inst. Bot. Acad. Sci. U.R.S.S. Ser. 4, Bot. Exp.)*

5: 258-294. 21 fig. 1941.—In *S. caprea*, nectaries occur on the first spring leaves whose blades have abundant marginal glands. Early in the season, these glands begin to guttate. Increased guttation and nectar formation may be induced by fostering the development of a stronger root system. On the leaves of the long branches of *S. caprea*, in nature and in cultures, the glands attained their greatest development in late leaves; but due to the intense stomatal evaporation, the glandules of these leaves showed little sign of guttation and no secretion of glucose. In *S. caprea* the teeth of the leaf blade in the autumnal leaves may expand; those at the basal part of the blade may develop into lobes, segments, or even into nearly independent leaflets like the leaflets of a compound leaf. The same series of leaf modifications may also be seen in *S. nigricans* and a similar phenomenon was observed in the formation of the late leaves in *S. pentandra*. All these phenomena are identical with the alterations observed in the leaves of *Prunus*. This is in conformity with the principle expounded by V. R. Zaleński for the structural changes that take place in the leaf blades of the same shoot developing during the period of most intensive vegetation. The results of these processes under a more or less abundant water supply tell on the structural properties of the plant.—The ecological descr. of variously differentiated vegetative shoots requires an international terminology: The following epithets, (one of which has been already introduced by Hartig) are proposed—brachyblast (a short shoot); macroblast (a long shoot); anabioblast (a dormant bud) baseoblast (a basal shoot (pullulus) proceeding from the basal parts of the stem near the root); and rhizoblast (a shoot proceeding from the root).—From auth. summ.

413. McDougall, W. B. (*Fish and Wildlife Serv., Santa Fe, New Mexico.*) Plant ecology. 3rd ed., thoroughly rev. 285p. Frontispiece, 118 fig. Lea and Febiger: Philadelphia, 1941. Pr. \$3.—The book is designed to be a college textbook suitable for beginning classes in plant ecology. The author first briefly discusses the structural ecology of roots, stems and leaves. There follows a discussion of all phases of symbiosis, including pollination, and a classification of symbiotic phenomena which is unusually detailed. These phenomena are divided into (I) disjunctive symbiosis, where the organisms concerned are not in actual contact, as in a forest community where trees shade other plants, and (II) conjunctive symbiosis where the symbionts are in actual contact. Here the author includes such relations as the liana habit under social conjunctive symbiosis. Nutritive conjunctive symbiosis is divided into (a) antagonistic symbiosis (parasitism) and (b) reciprocal symbiosis. Under the last heading there is a good discussion of mycorrhizas. The physical factors of light, heat, air, soil, and water are briefly considered and growth habits of plants include a synopsis of the life-forms of Raunkiaer. The final chapters are devoted to plant communities following closely Clement's classification. The examples of plant associations and plant successions are well chosen and are illustrated by good photographs. Every chapter is followed by a list of references, mostly of articles by American workers, which has been brought down to 1936. There is a useful appendix containing suggestions for the teacher concerning laboratory and field work.—G. D. Fuller.

414. MAGROU, JOSEPH. Nouveaux essais de culture des champignons de mycorhizes. *Compt. Rend. Acad. Sci. [Paris]* 208: 923-925. 1939.—From thin sections of mycorrhizae of *Arum maculatum* placed in hanging drops of medium the endophytic fungus developed. The medium is composed of soil extract, peptone of peanut, autolysate of beer yeast, egg yolk in alcohol, extract of roots of *A. maculatum* and sometimes indole-acetic acid and is adjusted to pH 6.6.—J. B. Routien.

415. NÉTIEN, G. Documents pour servir à l'histoire de la géobotanique lyonnaise. *Bull. Mens. Soc. Linn. Lyon* 9(2): 25-31; (3): 39-45; (7/10): 99-108. 1940.

416. PIDGEON, ILMA M. The ecology of the Central Coastal Area of New South Wales. IV. Forest types on soils from Hawkesbury Sandstone and Wianamatta Shale. *Proc. Linn. Soc. N. S. Wales* 66(3/4): 113-137. 5 fig. 1941.—An account is given of the distribution of forest types on the soils derived from Hawkesbury Sandstone and

Wianamatta Shale in the central coastal area of New S. Wales. Forests on sandstone are classified as variants of one association: the mixed *Eucalyptus* Forest; and forests on shale fall into several distinct associations: *E. hemiphloea*—*E. tereticornis*, *E. soligna*—*E. pilularis*, *E. viminalis*—*E. fastigata*, and *E. pauciflora*—*E. stellulata* associations. Data are given which illustrate the remarkable specificity of spp. of *Eucalyptus* to ecol. conditions, in particular to rainfall altitude, and soil type. The bearing of this phenomenon upon the problem of classifying the forests is discussed.—I. M. Pidgeon.

417. PIJL, L. van der. De herbegroeiing van de lavaoplop op den G. Galoenggoeng (Preanger). [The recovery of vegetation of the lava-plug on the G. Galoenggoeng (Preanger).] *Trop. Natuur* 29(8): 139-140. 1940.—The lava was formed in 1918 by the crater at 1200 m. elevation, forming a plug 150 m. high and 500 m. wide. In 1940 parts were covered with pioneers, among which are a moss *Thysanotrichum blumei*; *Lycopodium clavatum*, *L. complanatum* and *L. squarrosum*. Among the small shrubs and trees appear *Wendlandia glabra*, *Weinmannia blumei* and some spp. of *Aralia*, *Ficus* and *Melastoma*. In the crevices are a few ferns especially *Nephrolepis hirsutula* and some epiphytic orchids such as *Bulbophyllum* and *Agrostophyllum*.—J. C. Th. Uphof.

418. RAI, JACQUES. Phytogeography of Central Asia. *Bull. Fan Mem. Inst. Biol. (Bot.) [Peiping]* 11(1): 1-35. 7 pl., 13 fig. 1941.—A review of the physiography, climate, vegetation, and paleobotany, largely of Mongolia. 12 endemic genera are given. There are Central Asiatic-Mediterranean genera as well as certain insects, excluding ruderal plants, and 7 subtropical genera with Central Asiatic spp. The Euro-Siberian element (*Arctagrostis* and *Oxyria* being the most significant genera) occurs in the mountains surrounding the desert area. The America-Mongolia relationship is slender. Central Asia has been regarded as a center of distribution or migration but the affinities seem botanically, at least, to be rather the results of disjunction of a former more widespread distribution. Endemism here is the result of conditions of life in ancient times. This is a phytogeographical unit properly called Central-Asiatic regio. Bibliography.—E. H. Walker.

419. REIMERS, H. (*Bot. Mus. Berlin-Dahlem.*) Be- merkenswerte Moos- und Flechtengesellschaften auf Zechstein-Gips am Südrande des Kyffhäuser und des Harzes. *Hedwigia* 79(3/4): 81-174. 6 maps. 1940.—This region in the Harz Mts. is rich in rare spp. of plants, southern and southwestern spp. occurring together with arctic and alpine forms. Various moss and lichen associations are analyzed. Bibliography p.172-174.—E. K. Cash.

420. SEARS, PAUL B. (*Oberlin Coll.*) Postglacial vegetation in the Erie-Ohio area. *Ohio Jour. Sci.* 41(3): 225-234. 8 maps. 1941.—This paper discusses the evidence from pollen analysis which establishes the existence of a post-glacial warm dry period in eastern N. America. This period has been an important factor in the pattern of present-day native vegetation. The migrations within the glacial area of *Quercus*, *Tsuga*, *Fagus*, *Carya*, and *Tilia* are also traced. In general terms, the advance of *Quercus* and *Fagus* was northerly. *Tsuga* was dispersed from the northeast; *Carya* and *Tilia* from the west.—Auth. summ.

421. SEARS, PAUL B. (*Oberlin Coll.*) A submerged migration route. *Science* 94(2439): 301. 1941.—Two specimens of peat obtained at depths of 40 and 60 feet below the present water level at the Brooklyn Navy Yard were studied and indications are that, at the time the peat was formed, deciduous forest conditions prevailed presumably affording an opportunity for the northward migration of plants appropriate to deciduous forest conditions.—E. J. Umberger.

422. SKOTTSBERG, C. (*Bot. Inst., Göteborg, Sweden.*) Communities of marine algae in subantarctic and antarctic waters. *K. Svenska Vetenskapsakad. Handl.* 19(4): 1-92. 3 pl., 7 fig. 1941.—Marine algal communities of many littoral and sublittoral stations in the Falkland Islands, S. Georgia, West Antarctica (Graham Land), and S. America from Chiloé Island to Tierra del Fuego are descr. from data collected during the Swedish Antarctic Expedition (1901-1903) and the Swedish Magellanic Expedition (1907-1909).

The types of associations investigated are completely characterized and classified according to depth and nature of the substrate. The literature dealing with littoral and sub-littoral algal formations is briefly reviewed, and the following modified classification of formations is proposed: upper littoral formation of drought-resistant algae, middle-lower littoral formation of surf-resistant Rhodophyceae, middle-lower littoral formation on less exposed to sheltered coasts, surf formations of large Phaeophyceae, formation of large submerged Phaeophyceae; formation of giant Phaeophyceae with buoy-carried floating fronds, formation of deep-water Rhodophyceae, and formation of crustaceous Corallines. The geographic distribution of 326 spp. of Chlorophyceae, Phaeophyceae, and Rhodophyceae found in antarctic and subantarctic regions is summarized in tabular form. There are taxonomic notes on 36 spp.—R. W. Pennak.

423. SUGAWARA, SIGEZO. Schmidt's line in Saghalien viewed from the floral aspect. *Bull. Saghalien Locality Mus.* 1: 1-14. 1938.—Schmidt's line crosses the northern part of Saghalien from NW to SE.—H. Simons.

424. TOLSTEAD, W. L. (U. Nebraska.) Germination habits of certain sand-hill plants in Nebraska. *Ecology* 22 (4): 393-397. 1941.—Greenhouse and laboratory study of germination of sand-hill species showed 3 ecological groups: (a) those the seeds of which required previous low-temp. treatment, (b) those which germinated without low temp. but the sprouting of which was usually accelerated by such treatment, (c) winter annuals which germinated in autumn without low-temp. treatment. Normal germination of most sand-hill spp. occurs in the first warm days of spring.—Francis Ramaley.

425. TRANSEAU, EDGAR NELSON. (Ohio State U.) Prehistoric factors in the development of the vegetation of Ohio. *Ohio Jour. Sci.* 41(3): 207-211. 1941.—A brief account of prehistoric factors that left their marks on the present vegetation of Ohio. The occurrence of a large proglacial lake in south central Ohio and eastern Kentucky is discussed as the possible cause of the absence within this lake basin of certain spp. that occur today in isolated localities near the boundaries of this early Pleistocene lake.—E. N. Transeau.

426. WEAVER, J. E., and W. W. HANSEN. Native mid-western pastures: their origin, composition, and degeneration. *Nebraska Conserv. Bull.* 22. 1-93. 60 fig. 1941.—This study was made in eastern S. Dakota, Nebraska, and Kansas and in western Iowa and includes adjacent portions of Minnesota and Missouri. This area supports original prairie vegetation in part, but most prairies have deteriorated into various types of pastures. The degeneration of prairie to pasture has been studied over a period of 12 yrs. and 5 stages have been detd. No. 1 pastures are prairies that have not been misused. The forage usually exceeds the needs of the grazing animals and 20-25% is left at the end of the grazing season. There is little *Poa pratensis*. Many of the very palatable legumes and other forbs may remain. The cover is unbroken and its composition little modified. No. 2 pastures are uniformly grazed in favored areas and usually very irregularly elsewhere. *Poa pratensis* or *Bouteloua gracilis* and *Bulbilis dactyloides* are increasing in flat ravine bottoms, about gates or trampled places, and sometimes elsewhere; here the native bunch grasses have died. *Bouteloua curtipendula* nearly always shows distinct increases. Many legumes and certain other forbs have almost disappeared. A few invading weeds may occur sparingly, but the shiftings thus far are almost entirely among the native plant populations. In No. 3 pastures, *Poa pratensis* or *Bouteloua gracilis* and *Bulbilis dactyloides* or alternating areas of these either equal or exceed the usual true prairie species and form the matrix of the vegetation. Ravines are often entirely clothed with *P. pratensis*. Close grazing has sometimes resulted in islands of *P. pratensis* in areas of *Andropogon scoparius* and *Bouteloua curtipendula*. The original prairie spp. are still abundant, though clearly on the decline. The cover of grass is well intact. Certain prairie forbs have increased considerably, and a moderate number of introduced weeds have appeared in trampled places and dunged areas. No. 4 pastures have practically pure stands of *Poa pratensis* or *Bouteloua gracilis* and *Bulbilis dactyloides*. In the best

pastures, the cover may be well intact but frequently it is broken. Both perennial and annual weeds are typically abundant. Areas of grass frequently alternate with bare ground or soil clothed only with weeds. The grasses are often so severely grazed that the stand becomes thin. Deeply worn paths are common and many places in the sod are trampled bare. The final stage of degeneration occurs in No. 5 pastures where weeds, mostly annuals, often dominate. There are only fragments of the former cover of *Poa pratensis*, *Bouteloua gracilis*, *Bulbilis dactyloides* or *Sporobolus cryptandrus*. Deterioration has not taken place uniformly but has spread from the earlier centers of weed infestation. Often over considerable areas 75% of all vegetation has disappeared.—Plants are arranged in 6 groups according to their response to grazing. Prairie grasses that decrease under grazing include 10 of the most important native spp. *A. furcatus* was the most important grass of lowlands and occurred on uplands more sparingly. Because of its high palatability it is not only readily grazed but also selected by stock where other forage is abundant. It is gradually weakened under close grazing and finally dies. After three years of clipping (to simulate grazing) it was nearly replaced by a continuous cover of *P. pratensis*. *A. scoparius* was the principal dominant of the most extensive upland type of true prairie. It is readily grazed in spring and summer and when moderately or closely grazed it produces good forage throughout the entire growing season. It does not withstand grazing as well as the sod-forming *A. furcatus*. *Stipa spartea*, *Koeleria cristata*, and *Sporobolus cryptandrus* are bunch grasses and typically upland spp. All are relished by stock and disappear rather early. Exptl. clipping not only greatly decreased the yield but resulted in 2 years in the death of the plants. Other important grasses that decrease are *Sorghastrum nutans*, *Panicum virgatum*, *Elymus canadensis*, *Spartina pectinata*, and *Sporobolus asper*. Prairie forbs that decrease under grazing constitute a long list of important spp. All of the 45 listed are perennials, and 13 are legumes. The most abundant and widely distributed is *Amorpha canescens*, which alone may furnish annually 150 or more pounds of air-dry forage per acre. Certain prairie grasses increase under pasturing. The sod-forming Kentucky bluegrass (*P. pratensis*) is the first grass to resume growth in spring. It is unusually resistant to heavy grazing and maintains its hold and actually increases the stand even where the soil is trampled and the grass closely grazed. *Agropyron smithii* increases slowly under grazing and very rapidly where other vegetation is greatly depleted by drought. *Bouteloua curtipendula* increases slowly but consistently under grazing due to rhizomes and prolific seeding habits, despite the fact that, like *P. pratensis*, it is well liked by stock. *Bouteloua gracilis* and *Bulbilis dactyloides*, if present, increase greatly when true prairie is overgrazed, and become dominant in the western part of the area. Many prairie forbs increase under grazing since they are either entirely uneaten by stock or grazed so sparingly that they are not much handicapped. Certain grasses, mostly weeds, invade old pastures when many of the native grasses have died, leaving the cover broken. All are annuals of low forage value. A host of weedy forbs also enter native pastures when too close grazing, excessive trampling, and other causes result in much bare soil. A census of weedy prairie forbs and other weedy forbs and grasses was taken over a period of yrs. in 41 pastures with a total area of 3000 acres. All types of pastures were represented. Aside from the prairie grasses, a total of 87 such spp. entered into the composition of these pastures. Total number of spp. in types 1 to 5 were 25, 45, 72, and 59, respectively. The great drought resulted in marked changes in types of pastures. Many moderately deeply rooted species, such as *A. scoparius*, *P. pratensis*, and others, suffered losses as great as 80-95%. *P. pratensis* was nearly all killed in pastures west of the Missouri river. A tremendous increase in weeds and the spreading of grasses of a more drought-resistant type followed. *Sporobolus cryptandrus* rapidly increased from the status of an occasional invader to a species of major importance. This drought-resistant grass withstands grazing well, has excellent seeding habits, and furnishes fairly large ams. of forage of moderate palatability. *Agropyron smithii*,

formerly present in small amounts only, swept through pastures with astounding rapidity after 1934. It frequently replaced *P. pratensis* in *Bulbilis dactyloides*-*P. pratensis* pastures and formed an upper layer in *Bouteloua gracilis* and *Bulbilis dactyloides* pastures from which stock had been removed because of drought. *Bouteloua curtipendula* increased greatly during the drought. *Bouteloua gracilis* and *Bulbilis dactyloides*, which are even more drought-resistant, have not only spread widely from centers already established, but there has been a great eastward movement of these species along the whole western front of true prairie. A scourge of weeds occurred over a period of two to several years in pastures greatly depleted by drought.—Since the several yrs. of drought, the following pasture types are clearly distinguishable: *Andropogon*, *Poa pratensis*, *Bulbilis dactyloides*-*Bouteloua gracilis*, *Sporobolus cryptandrus*, and *Agropyron smithii*. In addition mixed pasture types of *B. curtipendula*, *Sporobolus cryptandrus*, and *A. smithii* occur. These may or may not have an understory of *B. gracilis* and *Bulbilis dactyloides*. An additional common type is that of *A. smithii*, *Bouteloua gracilis* and *Bulbilis dactyloides*.—J. E. Weaver.

427. WEAVER, J. E., and W. W. HANSEN. (U. Nebraska, Lincoln.) Regeneration of native midwestern pastures under protection. *Nebraska Conserv. Bull.* 23: 1-91. 1 pl., 35 fig. 1941.—The nature and rate of regeneration of a 23-year-old native pasture under complete protection from grazing were studied near Lincoln, Nebraska, during 1937 to 1940, inclusive. The pasture was of the little bluestem (*Andropogon scoparius*)—Kentucky bluegrass (*Poa pratensis*) type preceding the great drought of 1934-36, but was dominated by sand dropseed (*Sporobolus cryptandrus*) and side-oats grama (*Bouteloua curtipendula*) following the high mortality of the less xeric grasses. In 1937, both little blue-stem and big bluestem (*A. furcatus*) occurred very sparingly. Bluegrass remained only in scattered patches. Sand dropseed varied in occurrence from sparse to abundant as did also side-oats grama. Small amts. of blue grama (*Bouteloua gracilis*), June grass (*Koeleria cristata*) and a few other native grasses were found. Dense patches of peppergrass (*Lepidium densiflorum*) occurred throughout much of the pasture and Pursh's plantain (*Plantago purshii*) was abundant in widely distributed patches. These, with smooth goldenrod (*Solidago glaberrima*), many-flowered aster (*Aster multiflorus*), and horseweed (*Leptilon canadense*), were the major constituents of the weedy flora. 5 lots of permanent, meter quadrats were established in 1937 in which the increase or decrease of each sp. was detd. quantitatively by the stem-count method. Ten of these were marked out at random where sand dropseed dominated; 10 were located in remnants of little bluestem; and 10 where bluegrass persisted; 10 others included small patches of blue grama, and 3 bared areas occupied by peppergrass. The soil is a fertile clay loam. Rainfall from April to Sept. inclusive was 8.5 in. below the normal 21.3 in. in 1937, 0.6 in. above in 1938, 8.2 in. below in 1939, and 8.1 in. less than normal in 1940. Variations in the entire protected pasture were recorded. Data from each group of quadrats are presented separately by tables and graphs. Changes in the 43 quadrats taken collectively are shown for each of 4 yrs. of protection. Bluegrass comprised 56% of the total grasses in 1937, but only 3% in 1938. Total loss (1937-1940) was 91%. Its distribution in 1049 sq. dm. was reduced to 367. Sand dropseed in 1937 comprised 26% of the grasses. Its increase (1937-1940) was 137%. It was the most widely distributed grass, occupying 1841 sq. dm. in 1937. Chief development was that of plants already established. Side-oats grama gained 413% in 3 yrs. Its initial area of 571 sq. dm. was increased to 1384. Little bluestem gained 105% the first yr., 98 the 2d, and 17% the 3d. Total gain was 375%, but it spread only from 549 to 822 units. Big bluestem gained rapidly, 105 and 144% the first 2 yrs., and then decreased 8%. Total gain in number of stems was 362% and in unit areas occupied from 580 to 1245. Hairy grama, June grass, and Pennsylvania sedge (*Carex pennsylvanica*) all increased steadily. Only 5 of the 23 native forbs in the quadrats constituted 90% of the total native forb population. Of the 17 spp. of weeds, 3—horseweed, peppergrass, and little barley—were of outstanding importance. Foliage

cover under the 1st, 2d, and 4th yr. of protection averaged 30, 57, and 61%, respectively. Basal cover was 10.4, 21.2, and 19.6%, decrease under longest protection resulting from an increase in grasses of more erect growth. Yields in 1940 were obtained from large adjacent areas of old pasture that had been protected from grazing the 1st, 2d, and 4th yr., and from virgin prairie. 30 quadrats located at random under each condition were clipped at 4 different intervals. Yields of prairie grasses, pasture grasses, and forbs were detd. separately. Growth in height of prairie grasses after each clipping increased directly in proportion to the length of time of protection. Total yields of prairie grasses in %, based on the prairie as 100% and beginning with the first year of protection, were 8.3, 18.2, 66.7, and 100. Total yields of pasture grasses, based upon the 1st-yr. protection as 100%, were 100, 125.4, 56.7, and 5.2, respectively. Stating the yields of forbs in prairie as 100%, production in the pastures in order of increasing time of protection was 61.7, 73.5, and 91.5%. Total yields were largest in pasture protected a 2d year, next in that protected a 4th year, less in pasture protected the 1st year, and least in prairie. In tons per acre they were 1.51, 1.31, 1.15, and 1.12, respectively. Since yields alone do not furnish a proper basis for estimating forage values, a utilization factor was detd. for each species. This factor indicated the % of the particular species ordinarily removed by the livestock in grazing. It averaged 0.77 for the 3 chief prairie grasses found in pastures; it was 0.5 for sand dropseed, but only 0.1 for little barley. The % of total yield furnished by each species or group in each pasture was closely estimated. Utilization of the seasonal yield of prairie and pasture grasses and forbs was calculated from these data. In tons per acre, the amt. of forage that would probably have been utilized by stock in the several areas from pasture protected a 1st year to prairie was 0.49, 0.72, 0.74, and 0.76 of a ton, respectively. A single yr. of complete protection increased the quantity of vegetation utilized almost as greatly as 3 full yrs. of protection. 1 yr. of protection more than doubled the amt. of better forage grasses utilized and 3 yrs. of protection increased the amt. 8-fold.—J. E. Weaver.

428. WENT, F. W. (California Inst. Technol., Pasadena.) Influence of certain desert shrubs on the occurrence of annual plants. *Amer. Jour. Bot.* 28(8): 729. 1941.—An abstract.

429. WHITE, D. P. (U. Wisconsin.) Prairie soil as a medium for tree growth. *Ecology* 22(4): 398-407. 7 fig. 1941.—Chemical and biol. aspects of Wisconsin prairie soils were investigated with respect to their effect upon tree growth. Greenhouse trials showed that the early development of both conifers and hardwoods is hindered by some inherent deficiency of prairie soils irrespective of the environmental conditions. Chemical analyses revealed that the virgin prairie soils studied are somewhat deficient in available P and K but not to such an extent as to cause the early degeneration of trees. In pot culture expts., the application of fertilizers, including major and minor elements, produced yields on the prairie soils only half as great as were produced on untreated forest soils. Seedlings of *Pinus resinosa* and *P. strobus* raised on virgin prairie soil had sparse secondary roots and abundant root-hair development; seedlings simultaneously raised on prairie soils mixed with 10% humus sand from a forest nursery exhibited numerous secondary roots and abundant development of mycorrhizae. Isolation of the fungus, and re-inoculation of red pine with pure culture in sterile media showed an improvement in the development of both root systems and crowns. The lack of the growth-promoting action of mycorrhizal fungi appears to be the major condition inhibiting the growth of trees on mycorrhizae-free prairie soils.—D. P. White.

430. WOLF, CARL B. (Rancho Santa Ana Bot. Garden, Anaheim, Calif.) Germination of California native seeds. *Amer. Jour. Bot.* 28(8): 729. 1941.—An abstract.

OCEANOGRAPHY

(See also Entry 422)

431. ALLEN, W. E. (Scripps Inst. Oceanogr., La Jolla, Calif.) Offshore and depth distribution of marine plankton diatoms. *Amer. Jour. Bot.* 28(8): 728. 1941.—An abstract.

432. ISELIN, C. O'D. (*Woods Hole Oceanogr. Inst.*) Recent deep trawling in Cuban waters. *Turiox News* 18(1): 1-3. 3 fig. 1940.—Although the sea bottom around Cuba had been explored by the "Bibb" in 1869, by the "Blake" in 1877-79, and by the "Albatross" in 1919, the "Atlantis," in a circumnavigation of that island for 6 weeks in the winter of 1938 and for 7 weeks in the winter of 1939, dredged up over 100 spp. new to science out of 1400 spp. of animals collected. Two circuits of the island were made in an expedition sponsored jointly by The Museum of Comparative Zoology and the Univ. of Havana. Modern nets and improved methods of trawling were handicapped by rough sea bottom, the "Atlantis" locating only a few areas of smooth bottom in 13 weeks of trawling.—J. P. Givler.

433. MACGINITIE, G. E. (*California Inst. Tech.*) Life in a marine mud flat. *Turiox News* 18(1): 4-6. 3 fig. 1940.—Mud flats exposed by receding tides may be viewed as portions of the ocean floor with its fauna, except that the animal inhabitants have become adapted to periodic exposure. Adaptations have also been made to greater range of temp., O depletion and f.w. dil. Continued exploration quickens the eye to forms and to associations with respect to (1) reprod., (2) refuge, and (3) food-taking. Marine forms are often prolific—the ♀ oyster ♀ billion eggs in a season, a sea hare 478 million eggs in 4 mos. and 1 wk. Spawning of mudflat ♀ animals is "contagious," thus insuring fert. Many examples of commensalism, especially in burrows, and certain plants (e.g., *Zostera*) furnish concealment and refuge. Food is obtained from plankton, algal spores and protozoa by sifting water through bags or plates of mucus. Appendages for capture of food are also effective. *Calianassa* swallows mud and turns it over as do earthworms. Marine mud flat forms do well in aquaria if burrowers are given glass tubes and sand-sifters are placed in limoria (narrow, glass-sided frames).—J. P. Givler.

434. RICHARD, JULES. Sur une bouteille de construction simple pour les recherches oceanographiques. *Bull. Inst. Oceanogr. [Monaco]* 791. 1-4. 1 fig. 1940.

435. VON BRAND, THEODOR, and NORRIS W. RAKESTRAW. (*Woods Hole Oceanogr. Inst., Mass.*) Decomposition and regeneration of nitrogenous organic matter in sea water. IV. Interrelationship of various stages; influence of concentration and nature of particulate matter. *Biol. Bull.* 81(1): 63-69. 1941.—The decomposition of nitrogenous organic matter has previously been shown to result in the formation of ammonia, nitrite and nitrate in distinct, successive stages. With a recurrent supply of organic matter, formation of these products may take place simultaneously. The particular process which predominates will depend upon the stage at which the new organic matter is introduced. The nature of the suspended particulate matter undergoing decomposition, is of considerable importance in determining the total duration of the decomposition cycle, but the level of its original conc. is only a minor determining factor. There is some evidence of a "growth-promoting" factor, normally effective in the decomposition cycle, but which can be destroyed by high temp.—Theodor von Brand.

436. YUDANOVA, O. Chemical composition of *Calanus finmarchicus* in the Barents Sea. *Compt. Rend. (Doklady) Acad. Sci. U. R. S. S.* 29: 218-224. 1940.—The content in fat of *Calanus finmarchicus* increases with age and attains its max. in the red *Calanus* of the 4th and 5th Copepodan stages. Thus, by feeding upon *Calanus* in May and June most intensively the herring uses it at the period when it is highest in fat. The N content varies within a narrow range and is not connected with the fat content. The ash content varies within wide limits but this may be due to the admixt. of sea water, which cannot be gotten rid of.—R. Yablonsky (in *Chem. Abst.*).

WILDLIFE MANAGEMENT—AQUATIC

(See also Entries 436, 636, 657, 658, 659, 660, 1931, 1932, 1933, 1939, 1978, 1982, 1983, 1984, 1991, 1997)

437. COOK, DAVID B. (*State Conserv. Dept., Albany, N. Y.*) A long straight-log dam. *Jour. Wildlife Management*, 5(4): 472. 1941.—A dam built with a 52-foot log has withstood 2 spring freshets and is in perfect condition. Apparently no attention need be paid to limiting factors other than the size of timbers available.—W. L. McAtee.

438. FOSTER, RICHARD F. (*U. Washington*) Marking trout under anesthesia. *Progr. Fish-Culturist* 54. 30-31. 1941.—The methods and advantages of using a 5% soln. of C. P. ether as an anesthetic in marking small trout are deser.—Daniel Merriman.

439. MOROZOV, A. V. [On the method of Oscar Sund and on the utilization of this method for prognosis of anticipated fish hauls.] *Trudy Biologicheskogo Nauchno-Issledovatel'skogo Instituta. [Tomskii Gosudarstvennyi Universitet]* (Trav. Inst. Sci. Biol. Univ. Kouibycheff Tomsk) 4: 137-151. 1937.—The statistical method of analysis of fish populations described by Sund (see B. A. 6(2): entry 3352) is discussed, and applied to data relating to fishing records for the Caspian roach in the Volga-Caspian region since 1900. Several refinements of the method are suggested.—J. R. Carpenter.

440. MOROZOV, A. V. [On the problem of regeneration of a fish supply.] *Trudy Biologicheskogo Nauchno-Issledovatel'skogo Instituta. [Tomskii Gosudarstvennyi Universitet]* (Trav. Inst. Sci. Biol. Univ. Kouibycheff Tomsk) 4: 153-165. 1937.—Analysis, by the method of Sund, of the catches of the Caspian roach in the Volga-Caspian region in an attempt to discover the mechanics of regeneration in population fluctuations. Peaks of abundance occurred in 1909-10, 1915-7, 1922?, 1925-26, and 1930-31 during the period under study (1903-34).—J. R. Carpenter.

441. NAKAMURA, SYUYA. Ecological studies on the spiny lobster, *Panulirus japonicus* (v. Siebold), with special reference to its conservation, I. *Jour. Imp. Fish. Inst. [Tokyo]* 34(1): 101-113. 1 pl. 2 fig. 1940.—Growth of lobsters taken in the vicinity of Komimato is studied by carapace-length frequency distribution with the conclusion that lengths at the end of the 1st, 2d and 3d yrs. are respectively 30, 50, and about 65 mm. From studies of the increase in length and wt. following moulting, which takes place in about 15 min., it is estimated that there are respectively 10, 4, and 3 moltings in the 1st, 2d and 3d yrs. Weight increases approx. as the cube of carapace length. Sexual maturity is attained near the end of the 1st or the beginning of the 2d yr., and a minimum legal size limit of 50 mm. is suggested for local conservation. The spawning season at Komimato is at its height in July or Aug., depending chiefly on water temp., and it is suggested that the legal close season should be extended at least to early Aug.—A. L. Tester.

442. OSBORNE, LITHGOW. Is wild trout fishing doomed? *Prog. Fish Culturist* 54. 24-29. 1941.

443. SMITH, CHARLES G. (*Tennessee Valley Auth., Norris, Tenn.*) Egg production of walleyed pike and sauger. *Progr. Fish-Culturist* 54. 32-34. 1941.—Estimates of the av. number of eggs produced by a limited number of ♀ walleyed pike and sauger in Norris Reservoir have been made. The information on the walleyes suggests that there may be an inverse ratio between the rate of growth and the number of eggs produced.—Daniel Merriman.

444. SMITH, OSGOOD R. (*Stanford U.*) The spawning habits of cutthroat and eastern brook trouts. *Jour. Wildlife Management* 5(4): 461-471. 4 pl. 1 fig. 1941.—Wild *Salmo henshawi* and *Salvelinus fontinalis* were trapped during their spawning migrations in the spring and fall, respectively, and transferred to controlled stream sections. Both spp. were watched almost constantly from behind blinds throughout their periods of spawning activities. In both spp., the ♀ dug a pit in gravel for reception of eggs by flapping the tail on the bottom. Eggs and milt were ejected into pit simultaneously, where they were protected from the current, indicating efficient fertilization and small loss of eggs. *Salmo henshawi* ♀ covered eggs with gravel by digging with tail at upstream edge of pit. *Salvelinus fontinalis* ♀ covered eggs by rolling pebbles upstream with anal fin, then later threw up pebbles into a mound with tail. Quivering by the ♂ beside the ♀ was the principal courting act. Both sexes guarded nests. Photographs illustrate the principal actions described.—O. R. Smith.

WILDLIFE MANAGEMENT TERRESTRIAL

(See also Entries 384, 388, 390, 2113, 3174, 3439, 3440)

445. BECKER, E. M. An effective ground squirrel trap. *California Dept. Agric. Bull.* 29(3): 152. 1 fig. 1940.—A box

type killer trap descr. and illustrated.—Courtesy *Publ. Health Engineer. Abst.*

446. BECKER, E. M. A three-year record of ground squirrel trapping. *California Dept. Agric. Bull.* 29(3): 153-156. 1940.—Tabulation of trapped animals with details as to pregnancy and number of embryos of ♀♀. The information and conclusions given are from the trapping of some 18,000 ground squirrels. Use of steel traps is less selective than poisoning or gassing, hence employing the box trap is recommended. "Trapping is a slow and expensive method of squirrel control and is only justified in eradication work or where all other methods have failed."—Courtesy *Publ. Health Engineer. Abst.*

447. CRABB, WILFRED D. (Iowa State Coll.) A technique for trapping and tagging spotted skunks. *Jour. Wildlife Management* 5(4): 371-374. 4 pl., 5 fig. 1941.—A box trap has been devised for catching *Spilogale interrupta* that can not be prematurely tripped by wind, snow, ice, or water. It provides protection for the trapper from being scented and for the captured animal from the weather. Also an apparatus has been invented for handling and ear-tagging this skunk. It is primarily a narrow wooden passageway in the dark interior of which the animal may be crowded. A leather loop is provided for holding the head while ear-tagging. A plate glass window permits observation of sex and condition.—W. D. Crabb.

448. DAVISON, VERNE E. (Soil Conserv. Serv., Spartanburg, S. C.) Wildlife borders—an innovation in farm management. *Jour. Wildlife Management* 5(4): 390-394. 2 pl., 1 fig. 1941.—The wildlife border is presented as a means of land management in the new land-use patterns of southeastern agriculture. It is particularly needed between woodland and cropland and is a vegetated strip designed for multiple use for a turn row, erosion control, water disposal, control of trees, and for beauty and wildlife food and cover. The recommended border consists of two parts: A strip of *Lespedeza sericea* next to the crops and one of shrubby vegetation next to the woods. The herbaceous portion (15 feet wide) must be maintained free of shrubs and the woody portion (20 ft. wide), free of trees. The border serves wildlife best for nesting sites, travel lanes, roosting and resting areas, and escape coverts. Emergency food is also provided by *L. sericea* and by woody plants such as sumac, honeysuckle, grape, blackberry, dogwood, cedar, wild cherry, and persimmon, although the principal foods are available in the cropland on the one side and the woodland on the other. The wildlife border is acceptable to most farmers because of its simplicity, its easy maintenance, and its multiple values. The importance of this acceptability is stressed as a limiting factor to the use of wildlife management practices in agriculture.—V. E. Davison.

449. FRODINE, GORDON. Minnesota's deer problem. *Conservation Volunteer* 1(2): 18-23. 1940.—Cutting of the hardwood forest enabled the white-tailed deer to extend their range and to increase, finally to such a number that they depleted their food supply. Counts from 1935 to 1939 showed that the animals have been gradually decreasing. The limiting factor is the carrying capacity of winter "yards" and more deaths are due to malnutrition than to hunting. Hunting can and should be used as a tool to control the deer population.—Courtesy *Wildlife Review*.

450. GAFFNEY, WILLIAM S. (U. S. Forest Serv., Chateau, Mont.) The effects of winter elk browsing, South Fork of the Flathead River, Montana. *Jour. Wildlife Management* 5(4): 427-453. 4 pl., 1 fig. 1941.—A detailed discussion of the environmental conditions on the winter range of an estimated 2,600 elk on the upper South Fork of the Flathead R., Montana. With a summer range of about 420,000 acres, the elk are confined to a winter range of not more than 70,000 acres, of which about 20,000 acres are in a seriously overbrowsed condition. New growth is greatly reduced, and in some instances, almost completely checked on the preferred browse species: willow (*Salix*), dogwood (*Cornus stolonifera*), chokecherry (*Prunus demissa*), serviceberry (*Amelanchier alnifolia*), mountain maple (*Acer glabrum*), aspen (*Populus tremuloides*), and cottonwood (*Populus trichocarpa*). An increased density of the non-palatable shrubs such as buffaloberry (*Lepargyreus canadensis*), cinquefoil (*Dasiphora fruticosa*), alder buck-

thorn (*Rhamnus alnifolia*), and alder (*Alnus tenuifolia*) is not yet evident, but is anticipated in view of the reduction in volume of the more palatable shrubs. Conifers have been damaged by browsing in some localities. Grass forage has been depleted, but is partly protected by deep snows in the winter. As a result of the overbrowsing, there have already been severe losses in the elk herd, and it is believed that the stock is being degraded through the effects of insufficient winter feed. A table lists 78 of the plants on the winter range according to abundance and palatability.—W. S. Gaffney.

451. GRAHAM, EDWARD H. Legumes for erosion control and wildlife. *U. S. Dept. Agric. Misc. Publ.* 412. 1-153. 29 pl. 1941.—About 400 spp. of native and introduced leguminous plants, both herbaceous and woody, occurring throughout the U. S., are listed by scientific names in alphabetical order, with important synonyms and vernacular names. The range of each sp., description of the plant, and its agric. use are briefly noted. The species treated have been selected because of their use for erosion control or importance to wildlife for food and cover; these values receive major emphasis. The wildlife use is based upon stomach analyses in the files of the U. S. Fish and Wildlife Service plus references from the literature, both stomach records and observations. There are 21 pp. of introductory discussion of the importance of legumes to man and their rôle in soil and wildlife conservation. There are 29 plates, 21 of which include original line drawings of 128 spp. of legumes; the remainder are photographs of legumes being used for soil conservation. The wildlife use of legumes is cross-indexed under lists of birds and mammals, with a tabulation of the legumes each sp. of animal is known to utilize. There is a bibliography of 223 titles (exclusive of mimeographed works listed in footnotes), and a final list of vernacular names of legumes referring to the scientific names of the major list. One new combination, *Centrosema arenicolum* (Small) Graham, is proposed. The work is intended as a reference handbook for the wildlife manager and soil conservationist.—E. H. Graham.

452. GREEN, ROBERT G. Once more the grouse are back. *Conservation Volunteer* 1(3): 11-14. 1 fig. 1940.—Sketch of the snowshoe hare cycle and graph showing the population range revealed by 8 years of study—from 478 to 32 hares per square mile. The grouse cycle, not so well known, is nevertheless real and should be taken into account in defining open and close seasons. A number of questions are presented, satisfactory answers to which are needed as a guide to management.—Courtesy *Wildlife Review*.

453. HAMMOND, MERRILL C. (Fish and Wildlife Service, Upham, N. Dak.) Fall and winter mortality among Hungarian partridges in Bottineau and McHenry Counties, North Dakota. *Jour. Wildlife Management* 5(4): 375-382. 1 pl., 5 fig. 1941.—Fall and winter covey counts of Hungarian partridges (*Perdix perdix*) taken during 1938-39 and 1940-41 disclosed a loss of 22.2% and 30.1%, respectively, between brood season and Feb. average covey sizes. Brood sizes averaged 1.25 birds per covey smaller in 1940 than in 1938, possibly due partly to greater rainfall during the summer of 1940. Highway mortality was 0.93 and 0.92 birds per covey in 1938-39 and 1940-41, the loss being principally attributable to collision with automobiles, but partly to injuries caused by flight against elevated wires. The av. size of feed coveys was not consistently larger than that of coveys subsisting on natural foods and waste grains, and it is believed that, in the area studied, winter feeding of partridges is not necessary to insure high winter survival under ordinary conditions. Development of natural food and cover and protection from nest predators are recommended for improving local partridge ranges.—M. C. Hammond.

454. HAWBECKER, A. C. Planting for California wildlife. *California Fish and Game* 26(3): 271-276. 4 fig. 1940.—Food and cover plants essential to wildlife have been depleted in many areas but they can be restored to the advantage of both wildlife and soil conservation. An eroded farm near Watsonville, Calif., was planted and the California quail reintroduced. From 7, their number rose in 2 yrs. to 47, without predator control and with some hunting. Other kinds of wildlife also were benefited. The

plants most successfully used, and animal species present on the farm below (12) and after (30) planting are listed.—*Courtesy, Wildlife Review.*

455. HIGHBY, PAUL R. The story of Minnesota beaver. *Conservation Volunteer* 1(2): 41-46. 1940.—By the year 1900 beavers had been trapped almost to the vanishing point. Re-introduced in Itasca Park in 1901, the initial population of 3 (1 ♂, 2 ♀) had increased by 1907 by some 300 in the Park and had spread to other sections. In 1939 an open season was declared and more than 11,000 pelts were taken. The return to trappers was in excess of \$120,000. Conservative management is all that is needed to retain the beaver as a continuing asset. The animals' habits are described, and the problems they cause by flooding areas man desires for other purposes, their relation to trout streams and flood control, and the good they do in creating ponds and meadows also are discussed.—*Courtesy Wildlife Review.*

457. KOCH, ELERS. (U. S. Forest Serv.) Big game in Montana from early historical records. *Jour. Wildlife Management* 5(4): 357-370. 1941.—A description of big-game occurrence and abundance in Montana, since the coming of the white man, based on journals and accounts of a large number of the early explorers and fur-traders, especially Lewis and Clark, David Thompson, Alexander Ross, Ross Cox, Maximilian Prince of Wied, Captain Raynolds, Captain Mullan and others. Describes the vast herds of game on the Missouri and Yellowstone, but brings out the relative scarcity of game in the heavier-timbered parts of western Montana and Idaho. Distribution of elk discussed, especially their notable lack in extreme western Montana and west of the Bitterroot Mountains in Idaho. Attacks theory of some naturalists that present game herds in mountains are a remnant driven back by settlement from the valleys. Evidence is presented to show that the early explorers found more game in the mountains than now occurs there. Game in the valleys and plains was killed off, but the rough mountain country continues to give refuge to game animals already there, although elk particularly have been forced to winter at higher elevations than they did before settlement.—*Elers Koch.*

458. LYNCH, J. J. (U. S. Fish and Wildlife Serv., Pilottown, La.) The place of burning in management of the Gulf Coast wildlife refuges. *Jour. Wildlife Management* 5(4): 454-457. 1941.—Fire is a natural factor in the ecology of the Gulf Coast marshes. This study reviews the uses which man has made of fire in handling marsh lands and finds that burning is a most efficient and practical tool in marsh management for cattle, fur, and waterfowl. Marsh fires are classified as cover burns, root burns, and deep peat burns. The functions of burning are: improving habitat, promoting food production, increasing availability of food, protecting the marshes from uncontrolled fire, and facilitating trapping.—*J. J. Lynch.*

459. PETRIDES, GEORGE A. Observations on the relative importance of winter deer browse species in Central New York. *Jour. Wildlife Management* 5(4): 416-422. 1941.—Notes regarding 42 spp. of woody plants and 2,089 individual browsings upon them by Northern White-tailed Deer (*Odocoileus virginianus borealis*) were accumulated on the Connecticut Hill State Game Refuge near Ithaca, New York, during the winters of 1938-39 and 1939-40. Red maple (*Acer rubrum*), sugar maple (*A. saccharum*), staghorn sumac (*Rhus typhina*), and witch-hazel (*Hamamelis virginiana*) were considered to be of greatest importance, 46.5% of the total browsings recorded being of these spp. Large-toothed aspen (*Populus grandidentata*), quaking aspen (*P. tremuloides*), birch (*Betula*), oak (*Quercus*), round-leaved dogwood (*Cornus rugosa*), and striped maple (*Acer pensylvanicum*) were of "medium" quality and comprised 30.3% of the total, while 11 spp. of "fair" importance and 21 of "slight" value formed 17.4% and 5.8%, respectively, of the browse noted as consumed. Round-leaved dogwood, staghorn sumac, flowering dogwood (*Cornus florida*), and basswood (*Tilia americana*) were the principal preferred spp., while red maple, sugar maple, striped maple, witch-hazel, oak, and birch comprised the more important staple foods. The principal emergency

foods appeared to be hemlock (*Tsuga canadensis*), white pine (*Pinus strobus*), red pine (*P. resinosa*), Scotch pine (*P. sylvestris*), and beech (*Fagus grandifolia*). Of the total browsing recorded, preferred foods formed 21.8%; staples, 61.1%; emergency, 14.5%; and miscellaneous 2.6%.—*G. A. Petrides.*

460. STEARNS, L. A., D. MacCREARY, and F. C. DAIGH. Effect of ditching for mosquito control on the muskrat population of a Delaware tidewater marsh. *Delaware Agric. Exp. Sta. Bull.* 225. 1-55. 24 fig. 1940.—Following an introduction and brief discussion of mosquito control work in Delaware, the importance of the muskrat industry in the State, the selection and a description of the exptl. marsh area, exptl. procedure, and the effect of ditching in 1936-38 on (1) mosquito breeding, (2) height of water table, (3) character of vegetative cover, and (4) distribution of muskrat population are dealt with, and the continuance of the investigation is considered. Initiated by the station in 1932 at the request of resort interests, some 2,199 miles of ditches have been dug on an area estimated at 44,468 acres. This amounts to 44.7% of such land in the State and represents about 65% of the marshes which are serious mosquito-breeding areas. Much of the marshland bordering the Delaware River and Bay is adapted by nature to support a sizeable muskrat population, and for years a large proportion of the cash income of farmers in that part of the State has been derived from the sale of muskrat hides and meat. The total annual catch in the State approximates 150,000 hides, of which about 61% is derived from New Castle County, 14% from Kent County, and 25% from Sussex County. The total annual income to Delaware trappers from the sale of hides has ranged from as low as \$50,000 to as high as \$500,000. The average for the 20-yr. period, season of 1919-20 to that of 1938-39, inclusive, was slightly over \$200,000. During the yrs. 1936-39, inclusive, the effect of ditching for mosquito control upon muskrat life was detd. by population and other studies on drained and undrained marsh, the exptl. area comprising ca. 23 acres. The recorded data show very definitely that when a muskrat marsh, such as this, is effectively ditched for mosquito control there is a rapid lowering of the water table, which within a short time is sufficient to effect a radical change in the existing vegetation. The plants, particularly *Scirpus olneyi* and *Spartina cynosuroides*, upon which the muskrats feed and which are utilized by them in house construction are soon replaced by others (*Hibiscus oculiroseus*, *Kosteletzkyia virginica*, *Solidago sempervirens*, *Bidens trichosperma* var. *tenuiloba* and *Aster novi-belgii*) practically worthless for such purposes. This results in migration of muskrats from areas so treated to those which meet better their water and plant requirements. Observations over a period of years (1932-1939) indicate that productive muskrat marshes in Delaware are, generally speaking, relatively unimportant from the standpoint of mosquito breeding. Nevertheless, when such marshes are so located that mosquitos originating therein cause appreciable discomfort in, and retard the development of, resort and other communities and when this consideration obviously more than offsets that of the income derived locally from the muskrat industry, such areas should be brought under control by ditching or other means. The marshlands of New Castle County from Delaware City to Smyrna are particularly valuable, however, with respect to muskratting. Furthermore, while the mosquitos produced therein undoubtedly cause considerable annoyance to the scattered rural population throughout that section, trap records show that there is little or no migration to the towns located to the west. On the contrary, flight data emphasize a substantial eastward movement correlated with prevailing winds from the southwest during the months [of] May to September, inclusive. Control operations in that part of the State are certainly unwarranted except in the case of possible limited areas of heavy breeding. "Although the results of the experimental work treated in this bulletin permit but one conclusion, namely, that effective ditching of a productive muskrat marsh for mosquito control is definitely injurious, no attempt is made to generalize on the basis of the recorded data."—*Courtesy Exp. Sta. Rec.*

BIOLOGICAL ABSTRACTS

Editor-in-Chief, JOHN E. FLYNN; Assistant Editor, JEAN MACCREIGHT

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GENERAL BIOLOGY

Editors: A. H. GRAVES, *Plant*; C. A. KOFOID, *Animal*

(See also Entries 3493, 3496, 3638, 3759, 3763, 3768, 4262, 4519, 4521, 5072, 5206, 5596, 5714, 5810, 5953, 5992)

PHILOSOPHY OF BIOLOGY

3462. BENTLEY, ARTHUR F. The human skin: philosophy's last line of defense. *Philosophy of Sci.* 8(1): 1-19. 1941.—The assumption that the organism is cut off from its environment, as by an entity such as the skin, is false and a relic of pre-scientific thinking. It vitiates most of philosophic thinking, particularly in epistemology, and much of biological and psychological, especially in the use of such attitudes as those of the physiological psychologist, and in the idea of internal environment. The proper approach to the problem of knowledge treats it as a specialized type of response within an integrated organism-environmental field.—*L. J. Lafleur*.

3463. BERGMANN, GUSTAV. (State U. Iowa.) On physicalistic models of non-physical terms. *Philosophy of Sci.* 7(2): 151-158. 1940.—In connection with the problem of vitalism vs. physicalism, the latter understood as meaning the possibility of deriving the laws of any science from the laws of physics, it is of interest to see if it is possible to give at least one mathematical model for a non-physical term. The author finds it possible to present a mathematical system where certain variables may be stated to depend upon others while the inverse relation does not exist, and concludes that this may be used as a model for gestalt and teleological systems.—*L. J. Lafleur*.

3464. LILLIE, RALPH S. (U. Chicago.) Biological causation. *Philosophy of Sci.* 7(3): 314-336. 1940.—The problem of causation is less discussed and more difficult in biology than in physics. Probably this is because the physical sciences can deal with changing events within a "machine" or system which is itself almost completely static. In biology, on the other hand, these 2 factors merge, and the "machine" degenerates into a steady state which is the product of anabolism and catabolism. In addition to being a physical system, the organism seems to have an additional factor of inner or volitional determination, of which behaviorism can give only a partial account. Organisms are causal systems, combining the maximum complexity of organization and activity with an equal degree of constancy and reproducibility in extremely complex biol. and psychological traits, and continually resisting the thermo-dynamic and chemical tendencies which tend toward the destruction of complex fine-grained systems. Since analysis reveals the complexity of the system but fails to give a satisfactory account of its unity, it seems probable that biology is destined to become more and more completely a science of synthesis. The constants of synthesis, whether in the field

of biology or of psychology, cannot be wholly reducible to the physical constants, and physical atomism must be taken to be an abstractive procedure thoroughly warranted by the facts but not completely descriptive of observed reality. The synthetic factor may be identified as mind, and the organism as a whole as a psycho-physical system. Biological stability is predicated upon physical stability, and biological causation upon universal causation. If novelty appears in the

world, it cannot be accounted for in the rules previously existent, but must require new rules. The necessity for variation in biology is for something new, and from this demand there is no escape in the attempt to assign definite causes to biological mutation. There would seem to be no escape from the ascription of a certain variable element of spontaneity to natural processes in general.—*L. J. Lafleur*.

3465. MCCLUNG, C. E. (Swarthmore.) Biology—its social implications. *Bios* 12(3): 170-171. 1941.

3466. MALISOFF, WILLIAM MARIAS. (Brooklyn Polytech. Inst.) What is a monad? *Philosophy of Sci.* 7(1): 1-6. 1940.—In addition to atoms and genes as described by the author in other articles, the world may possibly contain entities having private character and the capacity for introspection, such entities to be called monads. Illustrations might be Driesch's entelechy and psychic phenomena, as well as such things as mind, soul and spirit.—*L. J. Lafleur*.

3467. TURNER, J. E. (U. Liverpool.) The distinction between "mechanics" and "mechanism." *Philosophy of Sci.* 7(1): 49-55. 1940.—The assumption that a mechanistic view of nature is no longer possible depends upon the confusion of 2 terms. Mechanics is not invalid, but only a classical form of mechanics which is itself rather limited in scope than displaced by more modern forms.

Mechanism may be true even if we accept a principle of uncertainty or grant a vital principle unlike anything found in non-living matter. The author apparently uses "mechanism" to mean what is more commonly designated as "determinism."—*L. J. Lafleur*.

3468. ZILSEL, EDGAR. History and biological evolution. *Philosophy of Sci.* 7(1): 121-128. 1940.—History is not to be considered a part of biological evolution, since its fluctuations occur in an order of magnitude other than that of evolution.—*L. J. Lafleur*.

MICROSCOPY

3469. EMMEL, VICTOR M. (U. Rochester.) Carriage for a large number of specimens during paraffin infiltration. *Science* 94(2427): 264. 1 fig. 1941.

3470. HAMLY, D. H. (U. Toronto.) A precision fine adjustment for standard microscopes. *Science* 94(2437): 263-264. 1 fig. 1941.—Of especial advantage for taking of series of photomicrographs with constant differences of focus—especially helpful for the correct interpretation of 3-dimensional structure, particularly of biological materials.—*M. A. Raines.*

3471. RHEA, H. E. (RCA Mfg. Co., Inc., Camden.) The RCA electron microscope. *Commun. Wallerstein Lab.* 4(12): 99-106. 7 fig. 1941.—The use of the electron microscope in studying details too small to be seen by the ordinary microscope.—*B. Steinert.*

LABORATORY APPARATUS AND TECHNIQUE

3472. BRISCOE, M. S. (*Storer Coll.*) Laboratory uses of the snail. *Turtox News* 18(3): 54, 55, 58. 1 fig. 1940.—Widely distributed and hence readily obtainable species of terrestrial and f.w. snails furnish excellent material for the study of variation; ciliary movement from the lining of the removed intestine; algae, collected by the gastropods in their search for food; and gametes (from macerated ovotestis of hermaphroditic *Physa*). Egg masses provide embryological material. Main features of the land snail's anatomy—head, foot, visceral mass, with further details—are easily worked out, while help in studies of the distribution of most forms should be obtainable from the large museums.—*J. P. Givler.*

3473. HYMAN, LIBBIE H. (Amer. Mus. Nat. Hist., N. Y. C.) Lettuce as a medium for the continuous culture of a variety of small laboratory animals. *Trans. Amer. Microsc. Soc.* 60(3): 365-370. 1941.—Boiled lettuce leaves furnish an excellent medium for the culture of a variety of small animals, such as *Daphnia*, oligochaete worms, rotifers, snails, *Chironomus* larvae, *Asellus*, and tadpoles. Other animals, such as hydras, planarians, small fish, salamander larvae, can be easily cultured by feeding them on animals raised in the lettuce cultures.—*L. H. Hyman.*

3474. TUBB, J. A., and ANDREW PROCTOR. A convenient accessory for the rapid microscopic examination of dry-mount objects. *Australia Counc. Sci. and Indust. Res. Jour.* 14(3): 220. Illus. 1941.—The authors describe and illustrate a spring-hinged clamp, $3\frac{1}{2} \times 1\frac{1}{2} \times 5/64$ in., designed to facilitate mounting for microscopic examination *Arripis trutta* scales which are convex and elastic when dry. The device saves time and is readily adaptable to many classes of microscopic work where temporary mounts are used.—*R. M. Weihing.*

TAXONOMY AND NOMENCLATURE

3475. SIMPSON, GEORGE GAYLORD. Range as a zoological character. *Amer. Jour. Sci.* 239(11): 785-804. 1941.—The difference between maximum and minimum observed values of a variate, defined as observed range, is commonly used in zoology and paleontology as a measure of variation in species or other groups. In fact the range observed in a sample is not directly related to the range in a population and is never a valid estimate of the latter. The common procedure of comparing ranges observed in samples of different sizes is also incorrect and may be grossly misleading. Range is related in a complex way with the sizes of samples or populations and their standard deviations. To make ranges comparable with each other and to make them consistent estimates of a character of the population, it is necessary to estimate mean ranges for groups of some standard size, here proposed as 1000. Methods for calculating such estimates, called standard ranges, are given, as well as tests of their reliability. Empirical study confirms their validity. Standard ranges and related methods permit quick and simple tests involved in zoological comparisons. They are cruder than the best statistical methods but they involve much simpler calculations and may be easier to comprehend. They are valid within their defined limits and frequently save the labor of making more complicated tests.—*Auth. abst.*

MUSEUMS, BOTANICAL AND ZOOLOGICAL GARDENS, AQUARIA, ETC.

3476. BISHOP, M. B. (Yale U.) A method for the preservation of spider webs for museum exhibits. *Turtox News* 18(5): 80-81. 1 fig. 1940.—Most museums lack spider

webs because of collecting difficulties. Nobody seems to know how one good set in the Amer. Mus. (New York) was collected but present author has worked out new technique of placing webs on black backgrounds (broad-cloth) in ordinary picture frames. The web is sprayed in the field with thinned lacquer while sprayed "gold size" causes it to adhere to backing. Further details of technique, including arachnological field notes, are provided.—*J. P. Givler.*

3477. MEYER, J. R. (*Inst. Biol. São Paulo, Brasil.*) Novo tipo de recipiente para montagem de peças de museu. [On a new type of glass vessel for mounting museum specimens.] *Arg. Inst. Biol. [São Paulo]* 11: 265-268. 4 pl. 1940.

ETHNOBIOLOGY

(See also Entries History of cinchona, 3490; Origin of rice, 3582; Crossdating in dendrochronology, 3694; Post-glacial history of British vegetation, 3698; Chestnuts in Neolithic alpine settlements, 3707; Indian elephants, 6095)

3478. ALEXANDER, E. J., and C. H. WOODWARD. The flora of the unicorn tapestries. *Jour. New York Bot. Gard.* 42(497): 105-122. 15 fig. 1941.—Illustration and discussion of some of the 115 different kinds of plants which are represented in the unicorn tapestries at the Cloisters in Fort Tryon Park, New York City.—*M. A. Rice.*

3479. ALEXANDER, E. J., and C. H. WOODWARD. Check-list of plants in the unicorn tapestries. *Jour. New York Bot. Gard.* 43(498): 141-147. 7 fig. 1941.—To conclude the study of the flora of the unicorn tapestries previously made, a check-list is given of 101 plants and their position in the designs is shown by numbered drawings.—*M. A. Rice.*

3480. KING, ELEANOR. Plants of the Holy Scriptures: The vegetational background of the Bible viewed in the light of modern knowledge. *Jour. New York Bot. Gard.* 42(495): 50-65. 16 fig. 1941.—A description and discussion of plants of Bible land, selected from the 181 spp. discussed by Dr. H. N. Moldenke.—*M. A. Rice.*

TEXTS AND EDUCATION

3481. DAVIDSON, MARGARET H. (*Gen. Biol. Sup. House, Chicago, Ill.*) Comparative embryology, IX. Gastrulae. *Turtox News* 18(6): 85-87. 3 fig. 1940.—One of a series of articles on general embryology in which the subject is presented by means of detailed descriptions of specific, well-selected material from a wide range of animal phyla. A former installment discussed cleavage stages through the blastula. Here the various types of gastrulae—embolic, epibolic, and delaminate—are descr. from the general and comparative point of view and in some detail, giving much practical information to the student of embryology.—*J. P. Givler.*

3482. MARKS, JAMES R. (edited by). Biology for life. A workbook and laboratory manual for use with any biology textbook, by HAROLD U. COPE and EDWIN LINCOLN MOSELEY. Rev. ed. xii+316p. Illus. College Entrance Book Co., Inc.: New York, 1941. Pr. \$7.20.—A very detailed biology workbook apparently adapted to almost any beginning biology text, particularly on the high-school level. Beginning college freshmen biology classes might also use this workbook very profitably. The total contents are listed under eleven well-chosen headings called units, each with several laboratory exercises and many appropriate questions. Page references for each unit are listed for about a dozen common high school biology texts. Special reports and projects are suggested for the better students. At the end of each unit a comprehensive test is given. The relation of biology to everyday life is stressed throughout. The entire workbook shows careful thought and wide teaching experience on the part of the authors.—*J. C. Johnson.*

MISCELLANEOUS

3483. BRAND, DONALD D. Where is the oldest university in the New World? *New Mexico Anthropol.* 4: 61-63. 1940.

3484. MORREL, MARTHA McBRIDE. When the world was young. xvi+252p. Houghton Mifflin Co.: Boston, 1941. Pr. \$3.50.

3485. PEARSE, A. S. (*Duke U.*) Hell's bells. xi + 121p. Durham. 1941.—This little book attempts to consider some of the problems of everyday living as viewed by a scientist. It contains 17 chapters on society, sex, love, faith, fear, adventure, religion, conservation, laws, education, human levels, being a member, ideals, trade, knowledge, success, and the future.—A. S. Pearse.

3486. STEINBECK, JOHN, and E. F. RICKETTS. Sea of Cortez. A leisurely journal of travel and research. x + 598p. Map, 40 pl. (8 col.) Viking Press: New York, 1941.—The account of an informal expedition into the Gulf of California by small boat, the object of which was to survey the shore animals of that inaccessible and, even to this day, little known region. Collecting stations were established at some 30 points on the Lower Californian and Sonoran shores, in a variety of habitats, from the surf-swept rocks at Cape San Lucas to the quiet-water mud flats of Agiabampo Estuary, and from the boulders at Puerto Refugio on Guardian Angel Island in the north to the coral reef at El Pulmo in the southern part of the Gulf. A popular narrative comprises the first half. The latter half of the book, consisting mostly of lists, is strictly scientific: an annotated catalog and bibliography of the 550 spp. encountered, a résumé of the literature in which some 479 titles are abstracted, and a summary of the state of our

knowledge with reference to the natural history of the Panamic Faunal Province; together comprising materials for a source book of the marine invertebrates of this region. The 138 illustrations are mostly plate gravure reproductions of drawings, photographs and color photographs of the commoner animals, plus itinerary and isotherm maps of the area involved. There is a glossary of scientific terms and a comprehensive index, both applying to the narrative portion only.—Authors.

3487. WELSH, J. H. (*Harvard U.*) Shore collecting in Bermuda. *Turtor News* 18(5): 77-79. 4 fig. 1940.—The Bermuda Biol. Station gives excellent opportunity for marine shore collecting, a wide variety of interesting forms being available, including *Valonia* and *Halicystis*, the annectant isopod *Ligia* (with important diurnal pigment-cell changes), red and black sponge colonies, *Stichopus*, the magnificent annelid *Terebella*, and *Oncidium*, the mollusc with "homing instinct." Across Long Bird Is. one finds *Planes*, *Petrolisthes*, chitons, *Aplysia* and, inter alia, the land nemertean *Geonemertes*. At night the "fire-worm" *Odontosyllis* glows and spawns and also, with lunar periodicity, appears the shrimp *Anchistiooides*. In deep water within an atoll the parrot fishes show wonderful colors while helmet diving brings one to the home of sea anemones, gorgonians and corals.—J. P. Givler.

BIOGRAPHY AND HISTORY

CARROLL W. DODGE, *Editor*

(See also Entries 3483, 3644, 4221, 4849, 4859)

HISTORY

3488. ASCHNER, BERNARD. Neo-Hippocratism in everyday practice. *Bull. History Med.* 10(2): 260-271. 1941.—The erroneous belief that medicine before the present era was unscientific, rudely empiric, even superstitious and harmful, has led in practice to a considerable impoverishment of our therapeutic power. Modern exptl. medicine urgently needs reorientation of medical thought and practice by Neo-Hippocratism. This should be a synthesis between rationalism and empiricism, between cellular (solidar) and humoral doctrine, between local and general pathology and finally between progress and tradition.—Sister M. E. Keenan.

3489. COKER, W. C. (edited by). (*U. North Carolina.*) Letters from the collection of Dr. Charles Wilkins Short. *Jour. Elisha Mitchell Sci. Soc.* 57(1): 98-168. 1941.—Includes many from Asa Gray, John Torrey, M. A. Curtis, G. Englemann and other biologists.

3490. HAGGIS, A. W. (*Wellcome Hist. Med. Mus., London.*) Fundamental errors in the early history of cinchona. I. *Bull. History Med.* 10(3): 417-459. 11 fig. 1941.—No remedial plant in the botanical world has been the subject of more controversy than the genus *Cinchona*. This is due to the confusion resulting from the fact that the name Quina Quina belonged originally to Peruvian Balsam, and to the fact that European medical writers lacked precise knowledge of the two trees. For this reason the early literature of Cinchona is replete with statements that belong not to it, but to Peruvian Balsam. Italian authors were chiefly responsible for establishing serious inaccuracies in the literature on the subject and subsequent writers have seriously added to these.—Sister M. E. Keenan.

3491. HENKIN, LEO J. (*Brooklyn Coll.*) The Pardoners sheep-bone and lapidary lore. *Bull. History Med.* 10(3): 504-512. 1941.—Medieval lapidaries provided Chaucer with the material from which he drew the therapeutic and thaumaturgic properties of his Pardoners sheep-bone. These properties were: to cure sick cattle, to increase wealth, to banish jealousy, each of which was to be effected by a specific ritual. No one stone or lapidary has been identified in all details with the powers of the sheep-bone, for Chaucer, it would seem, fused the properties of several precious stones in the crucible of his own humor.—Sister M. E. Keenan.

3492. KAGAN, SOLOMON R. Contributions of early Jews to American medicine. xv + 63p. 18 portraits. Boston Medical Publ. Co.: Boston, 1934. Pr. \$1.—This contains brief

biographies of 151 early American Jewish physicians with notes on their contributions to the biological and medical sciences. The introduction cites the work of eminent Jews in medical history and quotes the prayer of Maimonides; the work of Jewish physicians in the Continental armies, in the War of 1812, the Mexican War, the Civil War, and in the U. S. Regular Army. A chapter is devoted to Jewish contributions to internal medicine.—C. A. Kofoed.

3493. McDONALD, P. B. (*New York U.*) Scientific knowledge in historical crises. *Sci. Month.* 53(5): 454-463. 1941.—Catastrophes such as the Black Death and numerous military calamities due to inferior weapons revealed the need for a better understanding of science and hence gave impetus to research and invention. The modern world, however, has not yet learned how best to conduct such study, nor how to encourage the right types of scientists.—F. R. Hunter.

3494. MEINECKE, BRUNO. (*U. Michigan.*) *Aulus Cornelius Celsus—plagiarist or artifex medicinae?* *Bull. History Med.* 10(2): 288-298. 1941.—So divergent have been the interpretations of Celsus that the modern reader is tempted to despair. A review of the available evidence, however, proves that Celsus was a scholar of high attainments, famous for his mastery of scientific studies, notably agriculture and medicine. His *De Medicina* was of necessity based on Greek sources, which he usually cites, but it was written with independent judgment. It was Celsus who originated a new medical nomenclature for the Latin language.—Sister M. E. Keenan.

3495. MORRISON, HYMAN. Reginald Heber Fitz. *Bull. History Med.* 10(2): 250-259. 1941.—Reginald Heber Fitz's study of appendicitis and diseases of the pancreas together with his keen clinical judgment derived from this study entitles him to a place not only in the history of American medicine but in the general history of medicine as well.—Sister M. E. Keenan.

3496. SMALLWOOD, WILLIAM MARTIN, in collaboration with MABEL SARAH COON SMALLWOOD. (*Syracuse U.*) Natural history and the American mind. xiii + 445p. Illus. Columbia University Press: New York, 1941. Pr. \$4.25.—This historical study of the development of natural history in the United States is based upon original source material. Not only are the early American naturalists and their work described but also the influence of nature study upon the general cultural life of the American people. The growth of the evolutionary sciences is traced to c. 1850, when modern biological research started to take over the

subject-matter of nature study. Beginning with the naturalists who accompanied the early Spanish explorations, Oviedo y Valdes, Acosta, etc., the author traces the contributions to natural history of Thevet, Hacket, Harriot, Stachey and other French and English naturalists who first explored North America, together with the later naturalists who visited and collected in the English colonies (Catesby, Kalm, Mitchel, etc.). At this time the colonists themselves were producing first-rate naturalists (Bartram, Colden, Clayton, Dudley, etc.). In spite of the detailed study of this phase of the subject some American naturalists are barely cited and certain phases of the biological investigations are left out. Many of the text books of natural history used in the early colleges are listed and the rôle of nature study in the curricula evaluated. The subsequent development of natural history in the early republic is described with particular attention paid to new discoveries and to the teaching of the subject. There is a full but not complete bibliography and an adequate index.—Conway Zirkle.

3497. SWADOS, FELICE. Negro health on the antebellum plantations. *Bull. History Med.* 10(3): 460-472. 1941.—The popular conception of slaves leading a robust, healthy life in the idyllic surroundings of the plantation is false. Sickness was a grave human problem. Besides certain indigenous diseases, such as yellow fever, cholera, typhoid, and malaria, common to black and white alike, slaves suffered from many diseases which little affected the whites, at least those of the more privileged classes. These diseases were tetanus, pneumonia, typhoid pneumonia, cachexia Africana, sterility and uterine troubles.—Sister M. E. Keenan.

3498. WHITE, WILBARINE. (*Oklahoma City U.*) A chapter on the biological workers of the United States prior to 1800. *Bios* 12(3): 175-186. 1941.—Biographical sketches of John Bartram, Jane Coleen, Humphrey Marshall, Manasseh Cutler, Stephen Elliott, John Clayton, Gotthilf H. E. Muhlenberg, Thomas Walter, and John Banister, botanists; William Bartram, Wm. D. Peck, J. J. Audubon, naturalists; and Benj. Rush, Samuel Thompson, John Linnaeus, Edw. W. Shecut, and Thomas Bond, physicians. Several others were named.—L. J. Gier.

3499. ANONYMOUS. Classics of the alcohol literature. A document of the Reformation period on inebriety: Sebastian Franck's "On the horrible vice of drunkenness," etc. *Quart. Jour. Stud. Alcohol* 2(2): 391-395. 1 fig. 1941.

BIOGRAPHY

3500. ALEXANDER, C. P. Obituary Postamtmann i: R. M. P. Riedel. *Ent. News* 52(9): 268. 1941.—M. P. Riedel, a retired officer of the German postal service and a distinguished student of the Diptera, particularly of the Tipulidae, died on March 27, 1941, at Frankfurt am Oder. He was born Feb. 19, 1870.—C. P. Alexander.

3501. BELTRAN, E. El Prof. John Earl Guberlet (1887-1940). [John Earl Guberlet.] *Ciencia* 2(1): 35. 1941.—An

obituary of this American zoologist and oceanographer.—W. C. Tobie.

3502. BLATCHLEY, W. S. The days of a naturalist—An autobiography. *Bios* 12(3): 139-154. Illus. 1941.

3503. BORODIN, D. N. Dr. Nikolai K. Koltzoff, 1871-1940. *Jour. Heredity* 32(10): 347-349. 1941.—A brief biographical sketch is given. It cites, particularly, the varied interests and pioneering work of Dr. Koltzoff in the study of salivary chromosomes. The death of Mrs. Koltzoff a few hours after that of her husband is reported also.—L. M. Dickerson.

3504. CALVERT, PHILIP P. Samuel Henshaw, 1852-1941. An appreciation. *Ent. News* 52(9): 241-242. 1941.

3505. CALVERT, P. P. Obituary Alexandre Arsène Girault. *Ent. News* 52(9): 268-269. 1941.—Author of many articles on the parasitic Hymenoptera, on the life-histories and biology of various insects and of bibliographies of entomological glossaries, was born at Annapolis, Maryland, Jan. 9, 1884, and died at Brisbane, Australia, May 2, 1941.—P. P. Calvert.

3506. CALVERT, P. P. Obituary Prof. Charles Branch Wilson. *Ent. News* 52(9): 269-270. 1941.—Prof. Wilson was born at Exeter, Maine, Oct. 20, 1861, was head of the dept. of science of the Massachusetts State Teachers College at Westfield, 1897-1932, and died August 18, 1941. While his work dealt chiefly with marine Copepoda, the present notice is mainly concerned with that on the Odonata.—P. P. Calvert.

3507. CALVERT, P. P. Obituary Prof. Ellison Adger Smyth, Jr. *Ent. News* 52(9): 270. 1941.—Prof. Smyth died on Aug. 19, 1941. He was born at Summerton, S. Carolina, Oct. 26, 1863, was adjunct prof. of biology at the Univ. of S. Carolina 1889-1891, and prof. of biology at the Virginia Polytechnic Inst. 1891-1925. His publications are concerned chiefly with the Lepidoptera of S. Carolina and Virginia.—P. P. Calvert.

3508. CARRASCO-FORMIGUERA, R. Sir Frederick Banting. *Ciencia* 2(3): 128-130. Portrait. 1941.—A biographical sketch is given of this distinguished Canadian physician and discoverer of insulin.—W. C. Tobie.

3509. HARTER, L. L. William Williams Gilbert. (1880-1940). *Phytopath.* 31(11): 961-963. Portrait. 1941.—American phytopathologist.

3510. JACOBS, WALTER A., and DONALD D. VAN SLYKE. Phoebus Aaron Theodor Levene. 1869-1940. *Jour. Biol. Chem.* 141(1): 1-2. 1941.—Distinguished American biochemist.

3511. SOKOLOVA, E. V. (Mme). (Alexis Millardet.) *Îarovițăsiă (Vernalization)* 1(34): 93-97. 1941.—This is a brief biography of A. Millardet, with notes on his contributions in the field of botany and genetics.—P. A. Ark.

3512. VERNEY, L. Giuseppe Sanarelli. *Ann. Igiene* 50(5): 193-199. 1940.—A brief biography of this renowned bacteriologist and immunologist, who died on April 6, 1940. A short appreciation of Sanarelli's scientific work is included.—Carl Lamanna.

CYTOLOGY

Editors: R. E. CLELAND, *Plant*; C. E. McCLUNG, *Animal*

(See also Entries 3547, 3549, 3556, 3574, 3577, 3579, 3580, 3582, 3600, 3609, 3615, 4678, 4681, 5021, 5061, 5450, 5461, 5504)

GENERAL

3513. MORICARD, R. Facteurs hormonaux et cytoplasmiques de la division nucléaire, meiose et gonadotropines. 368p. Masson et Cie: Paris, 1941. Pr. Fr. 200.

PLANT

3514. AKINS, VIRGINIA. (*U. Wisconsin.*) A cytological study of *Carteria crucifera*. *Bull. Torrey Bot. Club* 68(7): 429-445, 39 fig. 1941.—The chloroplast is H-shaped in longitudinal section; strands extend from the periphery to the central region where the pyrenoid is located. The outermost portion of the pyrenoid at times stains differently from the remainder; this differentiated portion may represent a transition stage in the transformation of the pyrenoid substance into starch. The occurrence of 2 layers of starch

grains close about the pyrenoid and the variation in staining reaction of the pyrenoid indicate that from it are formed all the starch grains within the cell. 3, occasionally 4, blepharoplasts are visible at the bases of the flagella. In fixed material the contractile vacuoles are enlarged and the layer of cytoplasm between them resembles a rhizoplast. In no case is it possible to trace this layer or strand beyond the inner margins of the contractile vacuoles. Within the nucleus are 1-5 variously located bodies which are larger than the granules obviously of chromatin, yet which stain like chromatin with Feulgen's nucleal reaction and with haematoxylin. These bodies are probably chromocenters. Nuclear division is preceded by a revolution of the protoplast through an angle of 90° and by the division of the pyrenoid by constriction. There is no indication of a

centrosome at either pole of the spindle. The cytoplasm divides by constriction. There are 9 chromosomes.—*Virginia Akins.*

3515. BACCHI, OSWALDO. (Inst. Agron., Campinas, E. S. Paulo, Brasil.) (Cytological observations in Coffea. VII. Macrosporogenesis in the "monosperma" variety.) [With Eng. summ.] *Bragântia* 1(6): 483-490. 12 fig. 1941.—The "monosperma" var. is the only known haploid ($2n=22$) within the species *C. arabica*. The ovule develops normally at beginning, but irregularities occur in the 1st meiotic division of the macrosporocyte, very rarely an apparently normal macrospore being formed. Of 87 ovules examined only 1 contained an embryo sac. The microsporogenesis in this var. is also known as very irregular. The high sterility of the "monosperma" plants is thus explained on cytological basis.—*A. J. T. Mendes.*

3516. BRUMFIELD, ROBERT T. (U. Virginia.) Asymmetrical spindles in the first microspore division of certain angiosperms. *Amer. Jour. Bot.* 28(8): 713-722. 1941.—In the first pollen grain division the prophase nucleus is flattened against one side of the grain. At metaphase that spindle pole at which the generative nucleus is later formed lies next to the wall and is blunt or rounded while the vegetative pole, lying near the center of the grain, is acute. The centromeres of the chromosome group moving toward the generative pole occupy a greater area than those of the vegetative group and the arms of the former group are more widely spread apart. Measurements were made of the area occupied by the daughter groups of centromeres at different anaphase stages and the relative rates of movement of the 2 groups in *Pancratium illyricum* ($2n=22$), *Allium cernuum* ($2n=14$), *A. cepa* ($2n=16$), and *Tradescantia* sp. ($2n=24$). The generative group approaches the wall slower than the vegetative group travels in the opposite direction. The approx. path followed by the 2 daughter groups in anaphase was reconstructed. Asymmetry was greatest in the *Allium* spp., least in *Pancratium*. The degree of asymmetry was associated with the shape of the metaphase spindle which in turn was associated with the amt. of flattening of the prophase nucleus. In a triploid *Allium* the spindle was often found with both ends free from the wall. Here anaphase movement was symmetrical, indicating that asymmetry occurs only when one end of the spindle is next to a wall.—Asymmetry and the difference in rate of movement of the daughter groups are evidently primarily due to a slower development of the wallward spindle pole.—*R. T. Brumfield.*

3517. GELIN, OLOV E. V. The cytological effect of different seed-treatments in X-rayed barley. *Hereditas* 27 (3/4): 209-219. 1941.—After X-raying with a dosage of 10,000 r seeds with 10% moisture showed 12.66% disturbed divisions, with 15% moisture 27.99% and seeds soaked 23 hrs. in water or 0.01% hetero-auxin soln. 53.8 and 50.99% disturbances, respectively. The cells first entering into division showed the highest frequency of disturbances with the proportion of bridges to fragments, 1:2, about the same for all division classes. From this and other evidence, the author concludes that if the physiol. condition within the seed has been changed so that an increase in the number of disturbed cells takes place after identical X-ray dosages, we may expect a corresponding increase in the sterility of the X_1 generation and the mutation frequency in X_2 .—*F. N. Briggs.*

3518. GILES, NORMAN. (Harvard U.) Spontaneous chromosome aberrations in triploid *Tradescantia* hybrids. *Genetics* 26(6): 632-649. 20 fig. 1941.—The types and frequencies of spontaneous chromosome aberrations were studied at the 1st post-meiotic mitosis in the pollen grains of a diploid *T. paludosa*, an autotetraploid *T. canaliculata*, and several hybrid triploids resulting from a cross of these 2 plants. Two general classes of aberrations are distinguishable, those resulting from chromosome behavior at meiosis and those produced by spontaneous chromosome breaks during the post-meiotic development of the pollen grains. Aberrations in the first class, which may be distinguished in general by the absence of accompanying acentric fragments, consist of dicentric chromosomes, chromatid bridges, ring chromosomes, and chromosomes with shortened arms. They are most frequent in the triploids, which have the greatest amount of aberrant chromosome behavior at

meiosis. Aberrations in the 2d class are similar to those induced by irradiation of the developing microspore. They are much more frequent in the triploid hybrids than in the 2 parental pure spp., the ratio of break frequencies in the diploid, tetraploid, triploid hybrids being 1:2:12. The increase in spontaneous chromosome aberrations in the triploid pollen grains probably results from the genetic unbalance in these cells. This conclusion is supported by the fact that spontaneous aberrations in the root-tip cells, where there is no numerical unbalance, occur not only very infrequently, but also with approx. equal frequencies in the 2 parental plants and in the hybrids.—*Norman Giles.*

3519. HAGERUP, O. Nordiske Kromosom-Tal. I. [Chromosome numbers of Scandinavian plants.] *Bot. Tidsskr.* 45: 385-395. 1941.—During meiosis the chromosome numbers of the following arctic and Danish plants were detd.: *Botrychium lunaria* ($n=48$), *Luula frigida* ($n=18$), *Sparganium simplex* ($n=15$), *Myrica gale* ($n=24$), *Montia minor* ($n=9$), *M. rivularis* ($n=9$), *M. lamprosperma* ($n=9$), *M. (Claytonia) perfoliata* ($n=2 \times 9$), *Cerastium subtetrandrum* ($n=4 \times 9$), *Radiola linoides* ($n=9$), *Crassula aquatica* ($n=3 \times 7$), *Pepis portula* ($n=5$), *Centunculus minimus* ($n=11$), *Filago spathulata* ($n=2 \times 7$), *Matricaria ambigua* ($n=9$), *Lonicera periclymenum* ($n=2 \times 9?$), *Liparis loeselii* ($n=16$), *Corallorrhiza innata* ($n=21$), *Equisetum pratense* ($n=c. 120$). Of special interest is the Danish *Calla palustris*, which has twice as many chromosomes ($n=2 \times 18$) as the more southern form of the species ($n=18$).—*O. Hagerup.*

3520. HÄKANSSON, ARTUR. Zur Zytologie von *Godetia*-Arten und -Bastarden. *Hereditas* 27(3/4): 319-335. 1941.—Meiosis in spp. and species-hybrids of *Godetia* was studied. *G. whitneyi* $7_{II} \times amonea$ 7_{II} showed good pairing. In a triploid hybrid with 2 *whitneyi* genomes and one from *amonea* there were from 1-6 trivalents. In *nutans* $14_{II} \times whitneyi$ 7_{II} there were $7_{II} + 7_1$, indicating one genome in common. Some P. M. C. with 14_{II} were found in a cross between tetraploid *whitneyi* and *amonea*; however, a few multivalents usually were found. *G. hispida* has 7 large chromosomes; *G. "biloba,"* 8 small; *G. deflexa* and *G. viminea*, 9 large; *G. bottae typica* and *G. parviflora*, 9 small chromosomes. The investigated *parviflora* plant was thought to be a structural hybrid as it showed $7_{II} + 1_1 +$ a chain of III with the univalent lagging at anaphase I. The *viminea* plants showed a few univalents which did not lag, suggesting that it may have arisen from a cross between *viminea* and some sp. with a higher chromosome number. Forms from Chile had 17_{II} , the bivalents of which were similar to *viminea* in size and form. Hybrids of *tenella* $17_{II} \times Blauer zwerg$ 17_{II} had good chromosome pairing with a few multivalents indicating structural differences. Sometimes the broad spindles of the II division fused, forming dyad nuclei with 34 chromosomes. *G. quadrivalvula* and *G. purpurea* had 26_{II} of small chromosomes. They are thought to have arisen from crosses between 17- and 9-chromosome species.—*F. N. Briggs.*

3521. IVANOVSKAYA, E. V. [Cytological analysis of hybrids between diploid and tetraploid species of potatoes.] [With Eng. summ.] *Izvestia Akademii Nauk SSSR, Otdelenie Matematicheskikh i Estestvennykh Nauk. Seria Biol. (Bull. Acad. Sci. URSS. Cl. Sci. Math. et Nat. Ser. Biol.)* 1941(1): 21-33. 11 fig. 1941.—When diploid spp. of *Solanum* such as *S. rybinii* and *S. phureja* are crossed with a tetraploid sp. (*S. tuberosum*), there are obtained in the progeny not only the expected 36-chromosome forms but also many 48-chromosome forms. Morph. and cytol. investigation as well as the presence of a majority of 48-chromosome forms gives evidence that the latter are actual hybrids. These hybrids resulting from the union of an unreduced gamete from a diploid with a normal gamete of a tetraploid are called "hemiolodiploids." These hemiolodiploids are of great value for breeding work: they can be crossed readily with triploids, possess in greater measure the valuable characteristics of the diploid than do the triploids, and are more viable than triploids. In 36-chromosome some F_1 plants meiosis proceeds fairly regularly. The number of chromosome associations at metaphase I is about 20. Conjugation presumably takes place between the *S. rybinii* and the *S. tuberosum* chromosomes. In the hemiolodiploids conjugation is fairly regular. The progeny from

glands are active during the formation of any one slime-net. These active cells produce a secretion which is fibrous while in the duct. The slime-net formed from it is probably also fibrous but neither by direct observation nor in stained preps. can this be demonstrated.—Auth. (courtesy Wistar Bibl. Serv.).

3543. PEASE, DANIEL C. (Stanford U.) Hydrostatic pressure effects upon the spindle figure and chromosome movement. I. Experiments on the first mitotic division of *Urechis* eggs. *Jour. Morph.* 69(3): 405-437. 4 pl. 1941.—The known effects of hydrostatic pressures in greatly reducing the viscosity of plasmagels and plasmasols led the author to undertake an investigation of the mitotic figure of *U. caupo* eggs subjected to different pressures. The visible spindle is destroyed by 3000 lbs. per sq. in. Chromosome movement is considerably retarded by this pressure, very greatly slowed by 4500 lbs., and blocked by 6000 lbs. The anaphase movement under pressure is accompanied by the aggregation of chromosomes in fluid "vesicles," the fluid being probably derived from the solation of the chromosome sheath. Daughter nuclei are formed including only the vesicular contents, and thus elements of the nuclear matrix appear to be carried through the mitotic cycle. Functional, *de novo* half-spindles of purely cytoplasmic origin are formed after the release of pressure, and these pick up the chromosomes at any mitotic stage including forming daughter nuclei. The findings are discussed in relation to general theories of anaphase movement, and are considered to support theories which involve gel contraction or gel-sol transformation, acting in one way or another, and positive evidence is advanced against other theories. Also evidence is added that mitotic division and cytoplasmic cleavage are separate phenomena in their time relationships, but quite possibly the gels involved in both are of fundamentally the same nature.—Auth. (courtesy Wistar Bibl. Serv.).

3544. SCHRADER, FRANZ. (Columbia U.) Chromatin bridges and irregularity of mitotic coordination in the pentatomid *Peromatus notatus* Am. and Serv. *Biol. Bull.* 81 (1): 149-161. 16 fig. 1941.—Meiosis in *P. notatus* shows certain well defined abnormalities which arise from a precocity in the movements of the centers. This upsets the normal coordination of the mitotic processes, and results

in an asymmetrical mitotic figure in the 1st division, abnormal division of the chromosomes in the 2d, and the production of multinucleate spermatids. Chromatin bridges that characterize all 2d divisions arise from a failure of the chromatids to disjoin and are not due to inversions.—Franz Schrader.

3545. SCHRADER, FRANZ. (Columbia U.) Heteropycnosis and non-homologous association of chromosomes in *Edessa irrorata* (Hemiptera: Heteroptera). *Jour. Morph.* 69(3): 587-605. 2 pl. 1941.—In this pentatomid, a heteropycnosis of the terminal regions of the autosomes is correlated with bouquet formation. The latter is brought about by a peripheral collocation of the heteropycnotic sections during the synapsis period. After pachytene, the large heterochromatic aggregate breaks up into smaller aggregates. Cohesion or "stickiness" of the heteropycnotic sections that constitute the latter, results in a non-homologous association of bivalents which may persist into late diakinesis.—Auth. (courtesy Wistar Bibl. Serv.).

3546. TENNENT, DAVID H., and TOSHIO ITO. (Keio U.) A study of the oogenesis of *Mesplilia globulus* (Linne). *Jour. Morph.* 69(2): 347-392. 12 pl., 3 fig. 1941.—In *M. globulus*, the wall of the ovary consists of an outer coelomic epithelium, a middle muscular layer and an inner layer of oocytes. Maturation may take place while the oocytes are still in contact with the wall or after they have been crowded into the center of the ovary. There is never any stalk of attachment nor a definite cellular egg follicle. The diploid number of chromosomes is $38 \pm$. In the oogonia, 19 is the maximum number of chromosomes found, indicating a precocious pairing. In the 2 maturation divisions the polar spindles and the polar bodies show no definite orientation with respect to any region. Each polar spindle is at first amphialstral, becoming anastral at its outer end as it is flattened against the surface of the egg. As each polar body is formed, a definite ring of granules or "between body" is developed around the spindle; this remains as a large granule or disc on the surface of the egg just below the polar bodies. The "between body" of the 2d polar spindle interrupts the continuity of the jelly layer around the egg at this time, and explains the origin of the so-called micropyle or funnel at the animal pole.—Auth. (courtesy Wistar Bibl. Serv.).

GENETICS

Editors: ORLAND E. WHITE, *Plant*; SEWALL WRIGHT, *Animal*

(See also Entries 3515, 3517, 3518, 3520, 3521, 3522, 3527, 3528, 3530, 3535, 3539, 3598, 3650, 3656, 3657, 3691, 3778, 3787, 4327, 4328, 4329, 4345, 4369, 4394, 4459, 4463, 4469, 4558, 4656, 4659, 4663, 4782, 4962, 5050, 5061, 5183, 5215, 5287, 5316, 5353, 5433, 5457, 5461, 5470, 5486, 5502, 5504, 5572, 5573, 5574, 5575, 5577, 5585, 5769, 5815)

GENERAL

3547. DOBZHANSKY, THEODOSIUS. (Columbia U.) Columbia Biological Series No. XI: Genetics and the origin of species. 2nd rev. ed. xviii + 446p. 5 maps, 13 fig. Columbia University Press: New York, 1941. Pr. \$4.25.—The material contained in the first edition has been supplemented by summaries of recent investigations. To the chapter on Gene Mutations are added recent radiation studies, mutations produced by other agents and transformations of pneumococci: to Mutation as a Basis for Racial and Specific Differences, recent cytogenetic studies of *Drosophila*, racial distribution of human blood groups, organized systems of gene differences as in *Gossypium* species and serological differences as in *Columba* species: to Chromosomal Changes, X-ray treatments of *Tradescantia* and *Drosophila* and position effects: to Variation in Natural Populations, recent mathematical analyses (Wright) and gene arrangements in *D. pseudoobscura*. The chapters on Selection and on Polyploidy are thoroughly revised with addition of references to new data. The material on selection in populations of different sizes and on mutation in polyploids is included in a new chapter, Patterns of Evolution, to which are added discussions of progressive evolution, specialization and rudimentation, morphological and physiological differentiation, introgressive hybridization, retrogression of sexuality (apomixis, etc.) and a brief consideration of evolutionary factors in man. Under Isolating Mechanisms and

under Hybrid Sterility are many new references such as Patterson, Stone and Griffin (1940) on sterility in *D. virilis* hybrids. To the final chapter on Species as Natural Units is added a section on species, incipient spp. and races with discussion of Goldschmidt's (1940) views on origin of spp. by catastrophic systemic mutations.—P. W. Whiting.

3548. HALL, HENRY F. (Sir George Williams Coll., Montreal.) A note on terminology regarding intersexes. *Jour. Heredity* 32(9): 309, 314. 1941.—The author calls attention to the general misuse, even in textbooks, of the terms hermaphrodite, gynandromorph, monoecious and dioecious. Definitions for these terms and for the terms monoclinous and diclinous as applied to plants are given.—L. M. Dickerson.

PLANT

3549. ÅKERBERG, E. (Swedish Seed Assoc., Länna, Undrom, Sweden.) The application of cytology to herbage plant breeding. *Imp. Agric. Bur. Joint Publ.* 3. 52-61. 1940.—In this article are reviewed the principal contributions of the Swedish Seed Association's cytogenetic department, established in 1931. Because plants with high chromosome numbers were considered in general to be the most valuable types within a sp., most investigations have dealt with polyploidy as applied to breeding. Methods for altering chromosome numbers have consisted of species hybridization, heat treatment of young embryos, examination of

twin seedlings, and colchicine treatments. Within the genus *Phleum*, interspecific hybrids were made involving *P. pratense*, *P. nodosum*, and *P. alpinum*, and high chromosome twin plants were obtained from *P. pratense*. Some of the latter outyielded their corresponding 42-chromosome types. All euploid chromosome numbers from $2n=14$ to $2n=35$ and many of the intermediate aneuploid numbers have been found in the genus *Dactylis*. The euploid plants showed greater plant weight and fertility than the aneuploid types. Less work has been devoted to *Festuca*, *Lolium*, and *Bromus*, but several interspecific and intergeneric hybrids have been studied. Apomictic seed development has been investigated in *Poa*. Chromosome numbers ordinarily lie between 50 and 100, and they generally are aneuploid. An average of 10% twinning was found, with some plants ranging up to 25%. Purely sexual types also have been found in *Poa pratensis*. Plants with chromosome numbers about 50% higher than the mother plants were judged inferior to their mothers in several characters. A similar negative correlation between chromosome number and breeding value was found among 17 apomictic types found occurring in nature. Several spp. have also been studied in regard to chromosome aberrations, which are considered a common phenomenon in allogamous populations. It is considered that these aberrations are related to pollen fertility and that the latter is connected with maximum heterozygosity.—S. S. Atwood.

3550. AKERMAN, Å., und K. FROIER. Studien über eine spontane Chlorinamutation in *Avena sativa*. *Hereditas* 27(3/4): 371-404. 1941.—An account is given of the spontaneous appearance of a chlorophyll-deficient mutation, *chlorina*, in oats. The mutant plants are yellowish-green and, although retarded in development, complete their life cycle. Genetically *chlorina* proved to be a simple recessive to normal. 5 oat strains were thoroughly investigated for additional *chlorina* factors which resulted in the discovery of 3—*Chlor 1*, *Chlor 2*, and *Chlor 3*. The normal factor for each is completely dominant. The correct use of the terms "polymeric" and "homomeric" is discussed. Also the exceedingly low frequency of chlorophyll mutations in oats and wheat is discussed.—F. N. Briggs.

3551. ANDERSON, EDGAR (Missouri Bot. Gard.), and RALPH O. ERICKSON (Washington U.). Antithetical dominance in North American maize. *Proc. Nation. Acad. Sci. U. S. A.* 27(9): 436-440. 2 fig. 1941.—Antithetical dominance is defined: "In hybrids between extremely diverse parents, natural selection will tend to encourage those modifiers favoring one parental extreme or the other and suppressing intermediates." Hence the reaction curve for such hybrids will be rectangular instead of the usual gently diagonal one.—R. A. Muttkowski.

3552. AVAKIAN, A. A., and M. G. JASTREB. (Hybridization by grafting.) *Tarorvitsia* (Vernalization) 1(34): 50-77. 15 fig. 1941.—For expts. with tomatoes, vars. and spp. were taken with sharply contrasting characters: color—red, purple, white; shape and size of fruit—large and small; many celled and two celled, smooth and grooved; shape of bush—upright and spreading; structure and color of leaves. Seeds were planted in the greenhouse of the Inst. of Selection and Genetics at Odessa. The plants were grafted in Feb. and March, 1939. Many grafted plants were transplanted in the spring of 1939. A total of 380 grafts was made when the plants developed the 3 to 4 true leaves. For hereditary transmission of color from a stock to a scion by vegetative hybridization, a white-fruited tomato var. known as "Albino" was used. It was grafted to the red-fruited var. known as Mexican 353, and var. Preserving, New Tree, and others. On a scion of "Albino" grafted to the Mexican 353, there developed fruits changed in various ways. Thus out of 22 fruits, 11 were red, 8 yellowish-white with rose stripes and dots, and 3 yellowish-white (skin not colored). Changes in color of fruit were retained, and in a number of cases accentuated, in the 1st seed generation. There were differences in structure of the flowers, the shape of fruit, and the number of cells in the fruit in the progeny from the seed of the graft hybrid. F_1 plants also possessed the characters acquired in the year of grafting. Morph. changes in the leaves were observed in a number of cases. Thus, var. "Albino" grafted to "Preserving" gave seeds which

produced plants with different flowers, and with leaves with a ruffled surface resembling Preserving. Albino grafted to Mexican 353 gave plants with abundant sets of fruit, while the same var. grafted to Preserving produced in the next generation scarce fruiting and the presence of sterile and semi-sterile bushes. Numerous instances of changes in fruit, leaves, and other structures are presented and fully described, using other tomato vars., such as "Best of All," "Miracle of Market" and "Yellow Peach." A striking example of gradual changes in the shape of the fruit and other anatomical features on grafted parts is presented by expt. 3, in which tomato, var. "Rosso Grosso," was grafted on Mexican K-1014. Potato is an especially convenient material to observe specific influences of scion on stock at the end of the growing period. It is known that *Solanum demissum*, *S. acule* and other wild species of potato do not form tubers until the commencement of short days and low temps., but form a great number of overgrown stolons. When a cultivated var. of potato is grafted to these spp., tubers are formed at about the same time as on the plants of the var. used as a scion. On reversal of the graft, the early maturing cultivated vars. developed tubers late and approached the wild vars. As a result of grafting an early maturing white skinned potato, var. Epicur, to a red skinned late maturing var. Voltman, tubers were formed at the same time as for control Epicur plants, and there was a change in color of the skin in various degrees. By repeated grafting of Epicur to Voltman, it was possible to obtain almost white tubers. In the other series of grafting expts., the white skinned vars., Alma and Ella, were grafted to a red skinned var., Mica. At the present time, a 3d generation of the vegetative hybrid was grown, and it was found that certain plants formed white tubers and only the sprouts were colored rose. The variation in change in tuber characters and certain irregularities were studied on grafts of Early Rose, Ella, Odenwald Blue, etc.—P. A. Ark.

3553. AYYANGAR, G. N. R., and P. K. RAO. Studies in the millet, *Panicum miliaceum*, Linn. *Madras Agric. Jour.* 26(6): 195-206. 1938.—In Madras Province about 500,000 acres of millet are under cultivation as a short-season catch crop. In northern coastal districts it is raised as a dry-land crop and yields 500 lbs. per acre; in southern irrigated districts it yields about 1000 lbs. per acre. Flowers open between 10 a.m. and 12 noon, individual flower opening and closing in 5-7 min., and a panicle completes flowering in 10 days. Millet is ordinarily self-pollinated. Finger-thumb pressure on flowers induces opening about 1 hr. before normal and permits emasculation. The mode of inheritance of purple pigmentation, hairiness, and grain color is given. In absence of factor *P*, plants are green throughout (*pp*). An intensification factor, *I*, makes the difference between purple and light purple types. There are independent factors for hairiness. Hairless form is caused by absence of 3 factors, *H*₁, *H*₂, *H*₃. Intensity of hairiness is a cumulative effect of increasing addition of the *H* factor, the densely hairy type containing *H*₁, *H*₂, *H*₃. Grain colors are dark olive grey and buff yellow. A simple dominant factor, *O*, makes buff yellow into dark olive grey. Factor *L* lightens those 2 grain colors. Factor *L*, which lightens color on glume, is dominant to its absence. Factor *I* inhibits extension of color on glume making it ivory in color and is a simple dominant to its absence. Two grain colors, ivory grey and ivory yellow, are the result of operation of *I*. Reddish orange is a 3d whole-color simple recessive to buff yellow. A simple dominant factor (*Bf*) suppresses the red in reddish orange, producing buff yellow.—Cecil Yampolsky.

3554. BERESNIAKOVSKAIA, A. M. (Mme). (Obtaining of early maturing cotton, var. Sea-Island.) *Tarorvitsia* (Vernalization) 1(34): 40-46. 1941.—To change a heat-loving, late-maturing cotton var. (Sea-Island) into a less heat-loving, early-maturing kind, cotton was grown in a greenhouse having a temp. of 25-30° C with a 16-hr. day. Seeds were sown at intervals of 5 days, from Dec. 15 to Mar. 20. One-third of the plants were moved to a cold greenhouse (about Mar. 20); a 2d lot was moved Apr. 1, and the last lot was moved Apr. 6. In a cold greenhouse,

temp. fluctuated from 0 to $+2^{\circ}$ C at night, and from $+15^{\circ}$ to $+10^{\circ}$ C in the daytime. Provision was made to prevent frost. There was a gradual training to low temps. After 2-3 nights, the plants seemed wilted, but they soon assumed a normal appearance. As a result of this cycle of training, the plants gave a number of variations in morphology of the plant, and some plants had short branches and were dwarf. The dwarf plants exhibited a complete pre-frost ripening feature, a characteristic absent in the Sea-Island under the conditions of Mugan. The opening of the boll was wider, more like that of the "Upland" var. Genetic purity of the material was checked carefully. No hybrids or any mixture was noticed in the 1st generation. Besides morph. changes, there were changes as to the length of the vegetative period. In the 2d generation, for which 51 plants were selected out of 300 grown in the greenhouse and these exptl. plants were planted in the open from Mar. 30 to May 30 at different intervals, there were observed important changes. A vegetative period was shortened in some instances as much as 40 days, with an av. of 18 days. Progeny from a dwarfed, early maturing selection became normal, and had all of the typical characteristics of the Sea-Island var. As to the earliness in maturity, they surpassed all other lines with the shortening of the period by 29 days. Under the normal conditions obtained in Mugan, the vegetative period of the Sea-Island never was 130 to 140 days when planted in ground on April 20. The lines from the plants giving maximum changes in morphology and duration of the vegetative period give especial stability in the acquired changes in earliness. The author gives a complete report on behavior of the F_1 , F_2 and F_3 . The F_3 of the changed Sea-Island matures at the same time as Egyptian "Gisa 7" and "Faudy" which, as a general rule, mature 2-3 weeks earlier than the original Sea-Island. Rapid (in 3 years) changes in a hereditary nature of cotton by means of changing the conditions of training open up great possibilities for obtaining new vars. of plants and for obtaining changes in commercial cotton, increase in yield, and for moving the cotton industry into more northern latitudes.—P. A. Ark.

3555. BORKOVSKIIA, V. A. (Mme). (Vegetative hybrids and chimeras.) *Iaroviatsiia (Vernalization)* 1(34): 78-83. 6 fig. 1941.—Expts. on directed changes of the nature of plants, including changes by grafting, showed that due to the historically accumulated selectivity to definite conditions of existence, the organisms change only when they are deprived of the opportunity to assimilate under conditions common to their nature. Therefore, the best results from grafting were obtained when plants were placed under maximum dependence upon a component by which it was desired to change a given organism. This led to methods and means of regulating metabolism between a stock and a scion. These techniques include: grafting by "insertion" and in cotyledonous state; regulation of the relation of the foliar surface of a stock and scion; regulation of the quantity of the fruit, fruit buds, repeated grafting, etc. This work showed that, so far, it was impossible to obtain crossing with intermediate characters of genetic qualities between far distant species, such as tomato and *Lycium barbarum*, *Nicotiana tabacum*, etc. This is explained by the selectivity of the plants to assimilate necessary food elements. However, the admixture of stock by scion is possible in intervarietal grafting. Very often there is a domination of one component over the other. Such was the case when tomato, var. Albino (white fruited), was grafted to Mexican 353, or var. Humbert to Ficarazzi. Occasionally, "hybrids" of intermediate character could be obtained between distantly related species by grafting methods, very often obtained at the joint between 2 components of a graft. It is stated that the representatives of the Morganistic genetics explain the phenomenon as due to chimera formation. The author attempts to explain the appearance of the so-called chimeras on the basis of the work of Lysenko and quotes his statement: "By means of grafting, by means of skillful nutrition of plants of one kind, the plastic materials manufactured by the second kind, it is possible not only to obtain changes in heredity of organisms, but as a result of it, to develop true hybrids." The author performed an expt. to prove that chimeras are not a

result of mechanical mixture; but a definite effect of stock on scion: a *Solanum nigrum* scion in the 2- to 3-leaf stage was grafted on a tomato (var. Stoffert) stock originally bearing 5 to 6 leaves, from which all of the auxiliary buds were carefully removed, and 3 to 4 leaves were left for food assimilation. A well united graft was cut at the union so that a part of each component was left. In 20-30 days, under favorable conditions of moisture and nutrition, young shoots appeared on the cut surface. Only those shoots which showed some structural changes were used for rooting and for the future studies. A description of profound changes is given in great detail. The individuals obtained by this means were found to be sterile. A discussion is given to support the theory of the effect of stock on scion.

—P. A. Ark.

3556. BRINK, R. A., and D. C. COOPER. (*U. Wisconsin.*) Incomplete seed failure as a result of somatoplasic sterility. *Genetics* 26(5): 487-505. 1941.—Following the mating *Nicotiana rustica* ♀ \times *N. tabacum* ♂ only a small fraction of the seeds attain a germinable condition. Histological study shows that the course of seed development is similar to that in the *N. rustica* \times *N. glutinosa* mating, in which all the seeds abort early, in that (a) endosperm growth is retarded, (b) pronounced hyperplasia of the nucellus occurs, and (c) the integumentary cells lying between the apex of the vascular bundle and the chalazal pocket fail to differentiate into conducting elements. Development of the *N. tabacum* hybrid seed is less abnormal, however, than that of the *N. glutinosa* hybrid. This is expressed in a higher endosperm-nucellus volume ratio at the 2- and 4-celled proembryo stages and in a lower proportion of seeds at the 8- to 16-celled embryo stage in which the endosperm is occluded by the hyperplastic nucellus. Continued growth of the hybrid seeds is dependent upon maintenance of a direct association at the chalaza of the endosperm with the integument. The cells of the latter become depleted of their contents during growth of the endosperm and embryo.—Authors.

3557. BRYAN, A. A., and J. E. SASS. (*Iowa State Coll.*) Hereditary characters of maize; knotted leaf. *Jour. Heredity* 32(10): 343-346. 4 fig. 1941.—"Knotted leaf" is inherited as a simple dominant and is located on the 1st chromosome between *f*₁ and *bm*₂. The knots consist of folds in the leaf blade and sheath. Extensive proliferation of mesophyll parenchyma occurs but there is no marked increase in the thickness of the leaf. Expansion of the resulting stratified interfascicular tissue produces the characteristic "knots." Some localized proliferation occurs in procambium strands producing limited distortion of vascular tissues.—J. E. Sass.

3558. CARVALHO, ALCIDES. (*Inst. Agron., Campinas, E. S. Paulo, Brasil.*) The genetics of *Coffea*. [With Eng. sum.] *Bragantia* 1(6): 453-466. 9 fig. 1941.—The most visible differences between any 2 of the coffee (*Coffea arabica*) vars. *bourbon*, *nana*, and *murta* are due to a single pair of genes, namely *Na na*. Mutations of these genes from the recessive to the dominant and vice versa occur in nature and many cases are descr. in this paper. The most frequent direction of mutation is from the recessive to the dominant condition. The rate of mutation seems to be affected by modifying factors.—A. J. T. Mendes.

3559. DOLGUSHIN, D. A. (Seed production of grain culture.) *Iaroviatsiia (Vernalization)* 1(34): 6-26. 1941.—Pointing out the inconsistencies and errors of geneticists of the Morgan school, the author advocates new principles in seed production whereby, not only the purity of the seed is maintained, but the nature of the seed is improved. One of the methods consists in intervarietal pollination in the open, followed by adaptation to the environment.—P. A. Ark.

3560. EMERSON, STERLING. (*California Inst. Tech., Pasadena.*) Linkage relationship of two gametophytic characters in *Oenothera organensis*. *Genetics* 26(5): 469-473. 1941.—Crossovers between a pollen lethal and a self-sterility gene were detected by the presence of compatible pollen tubes in styles after appropriate pollinations.—Sterling Emerson.

3561. FRANDSEN, H. N. (*Danske Landboforeningers Frøforsyning og Fællesforeningen, Østoftegaard pr. Taastrup, Denmark.*) Improvement of herbage plants in Denmark.

Imp. Agric. Bur. Joint Publ. 3: 71-79. 1940.—A review. Herbage plant breeding has been performed in Denmark since the early yrs. of the present century largely by private firms. Most published reports of strain trials, however, have been issued by the Government Expt. Stations. The improvement of several spp. has been so marked that in some cases the new locally produced strains supply the entire market. The principal spp. worked with have been *Trifolium pratense*, *T. hybridum*, *T. repens*, *Phleum pratense*, *Lolium perenne*, *L. multiflorum*, and *Festuca pratensis*. A few improved strains of some other spp. have been used at various times. The principal breeding method has been selection within open-pollinated families rather than imbreeding. 6 of the best improved strains were based on only 1 original mother plant; the others were based on from 3 to 7. This method has given the best results when breeding was started with completely new material; constantly good results have been difficult to obtain by continuing along these lines.—S. S. Atwood.

3562. FRANDSEN, H. N. (*Danske Landboforeningers Frøforsyning og Fællesforeningen, Østoftegaard pr. Taastrup, Denmark.*) Some breeding experiments with timothy. *Imp. Agric. Bur. Joint Publ.* 3: 80-92. 1940.—Comparisons were made during the period 1929-1939 of families derived (1) by open pollination or (2) by diallel pair crossing and self-pollination. When 16 clones from either the Østofte strain or Finnish timothy were thus evaluated, the results from the 2 methods were very similar, indicating that at least for purposes of strain-building the test of open-pollinated families is adequate. Families derived from self-pollination or diallel crossing are most useful for further studies of individual qualities such as flowering, leafiness, tillering, and disease or cold resistance. The 1st generation inbreds showed a decline in vigor of about 25%; crossing sister plants caused only about half as much reduction in vigor.—S. S. Atwood.

3563. FRÖIER, KÄRE. Keimung und Triebkraft bei Hafer und Weizen nach verschiedenen Röntgendosen. *Hereditas* 27(3/4): 360-370. 1941.—The author attempted to determine the X-ray dosage necessary to decrease the germination percentages to 5-20% in di-, tetra- and hexaploid oats and wheat which Gustafsson had shown produced the highest frequency of viable and lethal mutations in barley. 45,000 to 55,000 r was found to be necessary in Victory, a hexaploid oat, to cause such a reduction in germination. 15,000 r dosage proved insufficient for *Triticum monococcum* (diploid) wheat; 15,000 r and 25,000 r were too low for *T. dicoccum* and *T. durum* (tetraploids), respectively; and 25,000 r did not cause the desired reduction in germination in *T. vulgare* (hexaploid) wheats.—F. N. Briggs.

3564. FULTON, H. J. (*U. S. Dept. Agric.*) Some factors that influence the immediate effects of pollen on boll characters in cotton. *Jour. Agric. Res.* 63(8): 469-480. 1941.—Strains of cotton inbred from 11 to 20 yrs. or more were used to test the immediate effects of pollen on boll characters. Emasculated flowers of Acala cotton were pollinated with (1) Pima pollen, (2) Acala pollen, and (3) Hopi pollen. Significant differences among means for the several cross-pollinations were obtained in number of seeds per boll, in seed index, in lint index, in fiber length, and in boll maturation period. It is shown that effects upon the expression of these characters by differences between different years, different days of anthesis in the same yr., different individual plants used as pistillate parents, and variation in conditions affecting the nutrition of the bolls are so great as conceivably to mask completely the effects of different pollens.—H. J. Fulton.

3565. GLUSHENKO, I. E. (Results of double pollination of barley in planting of the barley collection.) *Farovizatsia (Vernalization)* 1(34): 27-33. 13 fig. 1941.—Analysis of plants resulting from double intravarietal crossing performed in 1938/39 and 1939/40 at the Odessa Inst. of Selection and Genetics indicates that the majority of forms retained quite well their maternal type in planting of 1939/40, in spite of the cross-pollination with forms morphologically very different. Plants resulting from double cross-pollination are usually considerably taller than the original ones (checks) and the absolute wt. of the seed is increased

(table 1). Instances of loss of varietal patterns are reported. The author explains it by assuming that the plants of the susceptible vars. become more susceptible to biol. changes when transferred to unaccustomed ecological situations (in this case, from Siberian climate to the South).—P. A. Ark.

3566. GREENLEAF, WALTER H. (*U. California.*) The probable explanation of low transmission of certain monosomic types of *Nicotiana tabacum*. *Proc. Nation. Acad. Sci. U. S. A.* 27(9): 427-430. 1941.—Two main causes are operative in reducing the seed yields of haplo *P*, and in lowering the transmission frequency of the haplo *P* condition, namely, slow rate of development of the *n*-1 embryo sacs and a higher frequency of aborted embryo sacs prior to attainment of the 8-nucleate condition in haplo *P* than in the normal ones.—Auth. abst.

3567. GUSTAFSSON, ÅKE. Mutation experiments in barley. *Hereditas* 27(3/4): 225-242. 1941.—Seed samples of the pure line "Golden" barley were X-rayed with 5,000 and 10,000 r. Three degrees of seed hydration were used: 10 and 15% moisture and seed soaked for 24 hrs. in water or in auxin soln. The author believes that the direct proportionality in barley between dosage and mutation rate is only apparent. Those associated with profound chromosomal disturbances (highly sterile) and those arising in entirely fertile plant progenies do not show direct proportionality when considered alone. Mutations associated with small but evident changes do show a direct proportionality. The intentional direction of the process of mutation may take place to a certain extent in the following ways: (1) *Albina* mutations arise more frequently than other chlorophyll types at low dosages and to a greater extent in fertile progenies. They occur about 3 times as often in water soaked seed as in those of lower moisture. (2) *Xantha* mutations are produced most often at the higher dosage in slightly sterile *X₁* plants. (3) *Alboviridis* mutations occur as frequently in dry as in soaked series, but chiefly in progeny of sterile plants. (4) *Alboxantha* mutations occur only in soaked seed. (5) *Viridis* mutations occur in highly sterile plants which result from high dosages and soaked seed. (6) Finally, *Tigrina* arose exclusively from dry seed. In addition to the chlorophyll mutations a number of morphological forms have arisen which fall within the range of known variations in cultivated barleys. Some of these mutations, such as straw-stiffness, size of kernel, and earliness, are thought to constitute practical improvements as compared with the original var., although their comparative yielding capacity has not been detd.—F. N. Briggs.

3568. GUSTAFSSON, ÅKE. Preliminary yield experiments with ten induced mutations in barley. *Hereditas* 27(3/4): 337-359. 1941.—10 fertile mutations obtained from X-raying Golden barley were compared with the Golden and Maja vars. for yield and other characteristics. 7 mutant forms yielded less, but 3 equalled or surpassed the mother strain. Other characteristics which were changed in both directions from Golden were grain size and weight, number of ripe kernels, germination ripeness and protein and starch content. A general discussion concerning the significance of mutations to evolution, as well as induced mutations to plant breeding, followed.—F. N. Briggs.

3569. HAGIWARA, T., and M. NONOMURA. (*Tokyo Hort. Sch.*) Twin seedlings appeared in the Japanese morning glory. *Jap. Jour. Genetics* 16(3): 118-120. 2 fig. 1940.

3570. HARLAN, H. V., M. L. MARTINI, and HARLAND STEVENS. A study of methods in barley breeding. *U. S. Dept. Agric. Tech. Bull.* 720: 1-26. 1940.—379 crosses between 28 vars. were grown for 7 generations in separate rows without selection. Also equal ams. of *F₂* seed of these crosses were mixed and grown as a composite through the *F₇*. In the *F₈* the pedigree and composited lots were space planted and 2,921 single plant selections made from each. The next yr. (1936) agronomic data were obtained on the selections made in the *F₈*.—For Aberdeen, Idaho, conditions, the best parents came from N. Africa and Armenia, fair parents came from the Balkans, south Soviet Union, India, and China, while the poorest parents came from northern Europe and Manchuria. The best parents were Atlas, Minia, Trebi, Club Mariout, Arequipa, Sandrel, Flynn, Maison

Carré, Algerian, Good Delta, California Mariout, and Han River. Vars. grown commercially in the U. S. usually were found to have too many characters specifically suited to their localities to be highly useful as parents in a distinctly different area. Some vars. that were not quite equal to the best ones in plot tests proved to be highly desirable parents. Six-rowed \times 2-rowed hybrids were generally inferior to 6-rowed \times 6-rowed in yield. Yields obtained from pedigree crosses prior to selection were indicative of the crosses from which high- and low-yielding segregates were obtained and the low-yielding materials could have been discarded from the preselection data. The composite method apparently equalled the pedigree method. Hooded segregates were inferior to awned. Naked segregates were slightly less productive than covered. Midseason barleys were best adapted to Aberdeen conditions. Smooth-awned forms averaged greater floret sterility and slightly lower yields, but some individual strains may prove to be equal to the best rough ones. Segregates of average or slightly more than average height probably were better than very tall ones. Blue aleurone probably is not related to capacity to yield.—R. M. Weihing.

3571. KADAM, B. S., M. V. GADKARI, and G. G. PATH. (Rice Breeding Sta., Karjat, India.) A long-glumed mutation in rice. *Current Sci.* 10(7): 331-333. 1 fig. 1941.—Among rice plants with short glumes collected from Kolamba in 1940 one plant had long glumes. 20 seeds were grown in a pot; of these, 18 plants showed spikelets with long glumes, while 2 did not put forth any panicles.—R. A. Muttikowski.

3572. KHODKOV, L. E. (The appearance of "winter" and "semi-winter" plants in a progeny resulting from crossing spring grains.) *Iarovizatsiā (Vernalization)* 1(34): 47-49. 1941.—Exptl. data on crossing of 2 spring vars. of barley, namely *Hordeum vulgare* v. *dundar-beyi* Zhuk \times *H. v. trifurcatum* Schl., are presented to explain the reason for the appearance of the "winter" and the "semi-winter" plants which consist in the development of plants of F_1 under conditions promoting in them genotypic changes of the nature of iarovisation.—P. A. Ark.

3573. KHOSINA, E. P. (Mme). (The change in the shape of fruit in the seed progeny of grafts.) *Iarovizatsiā (Vernalization)* 1(34): 84-89. 3 fig. 1941.—Expts. were designed to study the effect of stock in changing the shape of fruit of tomato var. Humbert (scion). As a stock, the following species were employed: *Solanum nigrum*, *Lycium barbarum*, *Petunia violacea*, *Nicotiana tabacum* and *Datura stramonium*. The best graft union was found to be with *N. tabacum*. Grafting Humbert onto *S. nigrum* did not produce any visible changes in the scion, but the plants from the seed of fruits of this scion exhibited definite changes in the form of the fruit; they became round instead of being plum-shaped as in the original Humbert. Plants from the seed of "vegetative hybrids" by repeated grafting were exceptionally vigorous, with large leaves and an intense green coloration. There was an increase in the sugar content of fruits of the "vegetative hybrids." Grafting to *Lycium barbarum* resulted in shortening of the fruit on the scion, a bright coloring, a firm skin, and a very sweet taste. *P. violacea* stock induced profound changes in the fruit of a Humbert scion: grafts developed very slowly, the fruit on a scion was small and droopy, taste was markedly altered, and other changes are reported. When the Humbert scion was grafted to *N. tabacum* and *D. stramonium*, there were observed changes in the fruit of the generation from the seed of the "vegetative hybrid." The fruit from a hybrid Humbert \times *N. tabacum* tasted bitter, and while the fruit of *Datura stramonium* \times Humbert was not tasted, there was enough of alkaloid in it to cause smarting of the eye when it was cut.—P. A. Ark.

3574. KIHARA, H., und S. MATSUMURA. Weitere Untersuchungen über die pentaploiden *Triticum*-Bastarde XII. Schlussmitteilung. *Jap. Jour. Bot.* 11(1): 27-39. 3 fig. 1940.—This is the final number of a series of papers dealing with *Triticum* hybrids. For the frequency of the 28- to 42-chromosome F_2 plants of the pentaploid hybrids, the contribution of the following facts must be taken into consideration:—On account of the fertility of the F_1 hybrids probably half or more of the embryo-sacs are unfertilized; of these, those with intermediate chromosomes are numerous.

The univalents in the 2d maturation division are not distributed to the poles in a purely accidental fashion but partly grouped, i.e., several together. Accordingly both euploid gametes with 14 and 21 chromosomes are rather numerous. The elimination of univalents determines the production of relatively numerous gametes with fewer chromosomes by F_1 hybrids and such plants in F_2 . In the combination *T. durum* \times *T. vulgare* elimination is decidedly greater than in the combination *T. polonicum* \times *T. spelta*. In certain crossings, the 14- and 21-chromosome pollen grains play by far the most important rôle in fertilization, while the fertilizing capacity of those with intermediate chromosome numbers is significantly poorer. Moreover the pollen grains with the higher number of chromosomes are more efficient than those with fewer chromosomes, which must be responsible for the production of relatively more individuals with higher chromosome numbers in F_2 . But this relationship is not so easily observed in the hybrid *T. durum* \times *T. vulgare* as it is in the hybrid *T. polonicum* \times *T. spelta*. Following fertilization of eggs with fewer chromosomes by sperms with higher number of chromosomes, defective endosperm development makes germination difficult or impossible. Of the ungerminated grains and of the zygotes failing in the seedling stages the preponderant portion must contain \pm 35-chromosome embryos and 3(AB) + (\pm D) endosperm. The zygotic elimination of the sterile chromosome combinations of which many have intermediate chromosome numbers determines the flatness of the frequency of the different chromosome F_2 plants, especially in the combination *T. durum* \times *T. vulgare*, where the frequency is bimodal. Also according to the partially incomplete genome composition the germination and life capacity of the embryos with fewer chromosomes are less than those with the higher number of chromosomes, especially in the combination *T. polonicum* \times *T. spelta*. In the increasing group with 36 to 41 chromosomes the plants have at least a complete Dinkel genome, while the D-genome in the decreasing group with 29 to 34 chromosomes is incomplete. The further investigations concerning the variations of chromosome numbers and the fertility of the descendants in F_2 and subsequent generations of the pentaploid wheat hybrids reveal that in plants of the increasing group the failing chromosomes of the D-genome are gradually restored so that in the course of the generations they attain the constant chromosome number 42, whereas in the plants of the decreasing group, through the loss of univalents, the constant number 28 is attained. A complete equilibrium is obtained only when all have transformed into 4x or 6x. This rule has its greatest significance in the case of plants that are dependent upon sexual reproduction, and holds good generally for triploid or pentaploid hybrids.—P. D. Strausbaugh.

3575. KIRICHENKO, F. G., and A. S. MUSIKO. (On improvement of natural qualities of maize seed.) *Iarovizatsiā (Vernalization)* 1(34): 37-39. 1941.—The highest yield and the lowest % of smutted plants were obtained from maize (var. Brown Country) pollinated artificially in addition to the natural pollination. An additional (artificial) pollination is recommended to all stations engaged in breeding maize for higher yields and for changes of biol. properties of seed.—P. A. Ark.

3576. KRUG, C. A., e G. P. VIÉGAS. O trigo no Estado de São Paulo. Contribuição da seção de genética. [Wheat in São Paulo. Contribution of the Genetics Section.] *Inst. Agron. Est. Camp. Bol. Téc.* 48. 1-49. Map, 8 fig. 1938.

3577. LEVAN, ALBERT. The cytology of species hybrid *Allium cepa* \times *fistulosum* and its polyploid derivatives. *Hereditas* 27(3/4): 253-272. 1941.— F_1 plants of *A. cepa* \times *A. fistulosum* generally yielded a few poor seed, either from selfing or intercrossing. In 1938, 6 seeds germinated, 2 plants of which were triploids (24), 3 were hypo-tetraploids (30-31), and 1 a pure tetraploid with 32 chromosomes. The 4 F_2 plants remaining at the time of this study agreed in habit with the F_1 , previously descr., except they were somewhat taller and stouter. The pollen fertility was considerably improved in the tetraploid plant but it is almost completely seed sterile, although they develop normally to a fairly advanced stage. Structural irregularities such as deficiencies, inversions and multivalent formations were observed in pachytene and metaphase I of the F_1 . Meiosis

of 1 triploid and 1 tetraploid F_2 plant was studied in detail. Trivalents were common in the triploid plant, which confirms the conclusion, already arrived at in F_1 , that the chromosomes of *cepa* and *fistulosum* are, generally speaking, homologous. The tetraploid plant frequently formed 16 bivalents, which indicated amphidiploidy. The features of chiasma localization were discussed.—F. N. Briggs.

3578. MacARTHUR, JOHN W. (U. Toronto, Canada.) Size inheritance in tomato fruits. *Jour. Heredity* 32(9): 291-295. Frontispiece. 1941.—Four long-inbred tomato vars. bearing nearly spherical bilocular fruits of 0.8, 3.6, 54.9 and 106.8 gm. wt. respectively were intercrossed in all possible ways (diallel crosses). The parents and 6 F_1 hybrids were grown in a 10×10 Latin square. The means of mature fruit sizes form a simple orderly series, demonstrating that the size genes of a genome substitution do not add a specifiable number of grams to the fruit wt., but produce a regular proportional increase; the absolute amt. of the increase depends upon the basic size (cell number and size), detd. by other factors. Thus the size genes act on a geometric, not an arithmetic, basis.—J. W. MacArthur.

3579. MCCLINTOCK, BARBARA. (U. Missouri.) The association of mutants with homozygous deficiencies in *Zea mays*. *Genetics* 26(5): 542-571. 1 pl., 4 fig. 1941.—Viable mutants in maize may be produced by homozygous minute deficiencies. The aberrant mitotic behavior of ring-shaped chromosomes has been the method of obtaining a large number of such deficiencies. These deficiencies are located within the limits of a relatively small segment of the genomic complement composed of the proximal 9 chromomeres of the short arm of chromosome 5. Mutants arise following changes in the chromatin constitution of the ring-shaped chromosomes. These changes are produced following aberrant behavior of the ring-shaped chromosome in some of the mitotic divisions. The types of mutants which are produced by the altered ring-shaped chromosomes are simple, composed of a single recognizable character or compound, composed of 2 or more of the characters recognizable as simple mutants. In a number of cases it has been possible to isolate the altered ring-shaped chromosomes which produce the simple or compound mutants. Through appropriate tests, it has been proven that the compound mutants are the products of 2 or more of the simple mutants. One group of mutants has been located within the limits of the proximal 4 chromomeres of the short arm of chromosome 5. The 2d group of mutants has been located within the limits of the next 5 chromomeres. Apparently each mutant character, whether appearing as a simple mutant or in combination with other mutants, is produced by a homozygous minute deficiency, each mutant character being associated with loss of a particular minute segment. The simple mutants are associated with loss of one such segment; the compound mutants are associated with loss of 2 or more such segments.—From auth. summ.

3580. MATSUMURA, SEIJI. Weitere Untersuchungen über die pentaploiden Triticum Bastarde XI. *Jap. Jour. Bot.* 11(1): 17-25. 1 fig. 1940.—This is an investigation of the relationship between chromosome number and the form as well as the germination period of the grains produced by the F_2 descendants of the hybrids *T. persicum* Vav. var. *stamineum* Zhuk. ($2n=28$) \times *T. compactum* Host var. *creticum* Mazz. ($2n=42$).—P. D. Strausbaugh.

3581. MOKROV, S. B. (Concerning stability of characters in cross-pollinating plants.] *Farovizatsiia* (Vernalization) 1(34): 34-36. 1941.—The method of increasing the selected plants and their progeny under conditions of isolation has usually no scientific basis. To obtain a stable form in barley it is necessary to perform selection and comparison of lines under the conditions of open pollination.—P. A. Ark.

3582. MORINAGA, TOSHIKARO. Cytogenetical studies on *Oryza sativa* L. IV. The cytogenetics of F_1 hybrid of *O. sativa* L. and *O. minuta* Presl. *Jap. Jour. Bot.* 11(1): 1-16. 29 fig. 1940.—Only when *O. sativa* was the maternal plant could it be crossed successfully with *O. minuta*. Most of the F_1 plants developed only to the coleoptile stage and only 3 adult F_1 plants were obtained. Sterility was pronounced in the F_1 plants and they were susceptible to infection by bunt; therefore no F_2 plants were obtained. Since in meiosis of the hybrids, no regular formation of bivalents

was observed, the author concludes that "the chromosomal set of *O. sativa* L. is not homologous with either one of the 2 chromosomal sets composing the chromosome complex of *O. minuta* Presl," and that "*O. minuta* can not be taken as a stable hybrid of *O. sativa* and other species." No cultivated var. of rice with 2 chromosomal sets (24 gametic chromosomes), nor one having a set that differs in affinity from the normal, has been discovered, therefore *O. minuta* and *O. officinalis* can not be considered the progenitors of cultivated vars. of rice.—P. D. Strausbaugh.

3583. NILSSON, HERIBERT. Eine segregate Form von *Salix caprea*, die durch Stecklinge vermehrt werden kann. *Hereditas* 27(3/4): 309-312. 1941.—A form of *S. caprea* which can be propagated from cuttings was studied further. In crosses with spp. which do not form adventitious roots on cuttings both rooting and non-rooting segregates occurred but the data did not reveal the exact genetic nature of this character.—F. N. Briggs.

3584. NILSSON-LEISSNER, G., and FREDRIK NILSSON. (Swedish Seed Assoc., Svalöf, Sweden.) Herbage plant breeding in Sweden. *Imp. Agric. Bur. Joint Publ.* 3. 15-51. 1940.—This review article describes in considerable detail the methods and results of the forage-plant breeding which has been carried on in Sweden since 1904. An introduction includes descriptions of methods for vegetative propagation, techniques for isolation when selfing or crossing, and field plot techniques, after which separate discussions follow for each of the following spp.: *Trifolium pratense*, *T. hybridum*, *T. repens*, *Phleum pratense*, *P. nodosum*, *Dactylis glomerata*, *Festuca pratensis*, *F. rubra*, *Lolium perenne*, *L. multiflorum*, *Poa* spp., *Agrostis* spp., *Alopecurus* spp., *Bromus* spp., *Arrhenatherum elatius*, and several miscellaneous forage spp.—S. S. Atwood.

3585. PLATT, A. W. (Dominion Exp. Sta., Swift Current, Sask.) The influence of some environmental factors on the expression of the solid stem character in certain wheat varieties. *Sci. Agric. [Ottawa]* 22(3): 139-151. 1941.—When 2 solid-stemmed vars. of *Triticum vulgare* were grown at various Stations in western Canada the amt. of solidness exhibited varied greatly from Station to Station and from yr. to yr. Solidness was favored by high total hrs. of sunshine in June, high June temps. and low rainfall during the growing season. When grown in the greenhouse, under a series of widely different moisture conditions, all plants were hollow-stemmed. Widely spaced plants, in the field, were more solid than closely spaced plants. Artificial shading inhibited the expression of solidness. Variation in light intensity is deemed the chief factor responsible for variation in solidness. As the resistance of these varieties to *Cephus cinctus* depends upon the amt. of solidness present variations in solidness may be expected to result in variable resistance. In contrast to these vars. the solidness of Golden Ball, a var. of *T. durum*, was not readily modified by environmental factors.—A. W. Platt.

3586. POOLE, CHARLES F., PAUL C. GRIMBALL (U. S. Dept. Agric.), and D. R. PORTER (U. California, Davis). Inheritance of seed characters in watermelon. *Jour. Agric. Res.* 63(8): 433-456. 5 fig. 1941.—Three seed-length phenotypes were used in this study; short (av. 6 mm.), medium (av. 10 mm.), long (av. 13 mm.). They behaved with respect to each other as belonging in a dihybrid F_2 . Segregation of 9 medium *LS* to 3 long *LS* to 4 short (*Ls* and *ls*). 5 parent seed-coat color phenotypes used were black, clump, tan, white-tan-tip, and white-pink-tip. 7 parental combinations were made out of a possible 10. Seed coat color and patterns are determined by the interaction of 3 main genes *RTW* and 1 specific modifier *D* operating on black alone. The only linkage found was between *L* and *W*.—Authors.

3587. RANDOLPH, L. F. (Cornell U.) Genetic characteristics of the B chromosomes in maize. *Genetics* 26(6): 608-631. 1941.—The supernumerary B chromosomes of maize, which differ morphologically from any of the normal A chromosomes, are transmitted freely by both ♂ and ♀ gametes and can be reduplicated repeatedly, since the number of B's is variable in the progenies and numbers higher than the parental numbers occur not infrequently. B-chromosome detns. were made in 1049 plants of selfed progenies of individuals with from one to 20 B's, i. 109 plants from direct and reciprocal crosses of O-B

chromosome plants with from one to 25 B's and in 788 plants from sib-crosses of individuals with different numbers of B's. The highest number of B's obtained in any one plant in addition to the normal 20 A's was 34; several others had 30 or more B's and there were many with from 20 to 30 in addition to large numbers of plants with fewer than 20 B's. The B's are not essential to the normal growth and reproduction of the plant, nor is there any conclusive evidence of beneficial or deleterious effects when small numbers are present. However, their prevalence in Black Mexican and Golden Bantam sweet corn and their absence in most commercial dent vars. suggest the existence of such effects, but none was discovered. But when present in high numbers, they cause reduction in vigor and fertility, a noticeable increase in cell size and the production of defective seeds often with scarred and otherwise deformed endosperm. These deleterious effects made the accumulation of the B's in numbers > 30 very difficult. In a search for dominant alleles of known recessive genes that might be present in the B's, 43 linked genes distributed among 17 of the 20 arms of the 10 A chromosomes and 6 unlinked genes were tested with negative results. Evidently none of the 20 arms of the A chromosomes contributed directly to the origin of the B chromosome by simple fragmentation. Various derivatives of the B chromosomes, classified according to size as C, D, E, and F chromosomes, were deser.—*L. F. Randolph.*

3588. SENGBUSCH, R. v. (*Luckenwalde (Mark.) Tomatenzüchtung. Frostwiderstandsfähigkeit, Lagerfähigkeit, Hochglanz der Fruchtschale und Zwergformen. Pflanzenbau* 17(5): 143-152. 11 fig. 1940.—A wild var. of tomato, *Solanum racemigerum*, was crossed with various cultivated types and the properties of the resulting progeny observed. No especially frost resistant types were obtained. A method is deser. for evaluating the frost resistance of the plants in the field. It makes use of the observed temp. difference (4-5°) of the earth's surface between the peaks and valleys of a rolling terrain. A fruit suitable for storage, possessing properties of early ripening and non-bursting, was obtained from certain crosses. Some strains gave a fruit of high gloss. Other crosses resulted in dwarf forms suitable for ornamental purposes.—*C. K. Horner.*

3589. SLEESMAN, J. P., and F. J. STEVENSON. (*U. S. Hort. Sta., Beltsville, Md.*) Breeding a potato resistant to the potato leafhopper. *Amer. Potato Jour.* 18(10): 280-298. 1941.—Many vars. and progenies have been tested over a period of yrs. Significant differences were found between vars. in their reactions to leafhopper injury. Nymphal populations were larger on some seedling vars. than on others. Several seedling vars. were much more resistant, and some were more tolerant than were any of the old potato vars.; none of them were immune, and if this character is desired hybrids between such immune spp. as *Solanum polyadenium* and commercial vars. probably will have to be used. In the progenies interactions of genetic and environmental factors were plainly discernible, but the number of genetic factors involved was not detd.—*F. J. Stevenson.*

3590. SMITH, HAROLD H., and CHARLES W. BACON. (*Bur. Pl. Indust., Washington, D. C.*) Increased size and nicotine production in selections from intraspecific hybrids of *Nicotiana rustica*. *Jour. Agric. Res.* 63(8): 457-467. 2 fig. 1941.—New lines of *N. rustica*, developed by hybridization and selection, were significantly larger on an average than their 3 parental strains, namely, *N. rustica* var. *brasiliensis* (strain 34753), tall type, and Olson 68. The characteristics measured were plant height, number of leaves, and size of largest leaf. These were controlled by relatively independent genes that could be recombined in advantageous groupings. The best parent values were usually not exceeded until new homozygous combinations were established in the *F*₂ or later generations. The original strains differed by some genes for each character. Further increases in size were obtained by crossing *F*₁ selections of the new lines together. The occurrence of some exceptionally large segregants suggests that still further increases in the av. size will be possible. Related data on the wt. of dried leaf material and percentage of nicotine were reported. Estimated potential yields of nicotine per acre were calculated from these figures, and selections in the new strains, to the

*F*₁, proved superior to their original parents in this respect. The possible economic importance of the improved lines, for use as a source of nicotine for insecticidal purposes, was discussed.—*Auth. summ.*

3591. TORSSELL, R. (*Swedish Seed Assoc., Ultuna, Sweden.*) Lucerne breeding in Sweden. *Imp. Agric. Bur. Joint Publ.* 3. 62-70. 1940.—A review. The present area of alfalfa cultivation in Sweden is small principally because seed production is difficult, and consequently few locally adapted strains have been developed. Fundamental investigations on the failure of good seed set have shown that although tripping appears essential, the main limiting factors are humidity and temp. The aims in breeding, which has been carried on since 1905, are winter hardiness, yielding capacity, abundant aftermath, and satisfactory seed yield. Hungarian alfalfa was formerly considered the best breeding stock, but now Grimm, Franconian, and Ultana (resulting from natural crosses of *Medicago falcata* \times *M. sativa*) are used. Several studies of breeding technique, as related to fertility and effect of inbreeding, have led to 3 main breeding methods, 2 of which involve inbreeding by self-fertilization. No new strains have been released, but three have been selected and are now being increased while testing is continued.—*S. S. Atwood.*

3592. WADE, B. L. (*U. S. Dept. Agric.*) Genetic studies of variegation in snap beans. *Jour. Agric. Res.* 63(11): 661-669. 1 fig. 1941.—The variegation studied is expressed over a wide range from a trace up to a very severe, semilethal condition. The range is approx. the same for variegated lines due to 1, 2, or 3 factors but the av. amount of variegation for 3 factors is more than for 1 or 2, and the average for 2 more than for 1. The variegation considered is due to any one of 3 recessive factors, whereas the normal condition is due to the complementary action of 3 dominant genes giving in *F*₂ a ratio of 27 normal to 37 variegated for the cross of Black Valentine with the original variegated strain and the reciprocal cross. Studies of *F*₁ and some *F*₂ families were made as well as studies of crosses between the various variegated types.—*B. L. Wade.*

3593. WEXELSEN, H. (*Felleskjøpets Stamsedgaard, Hjellum, Norway.*) Chlorophyll-deficient seedlings in timothy (*Phleum pratense L.*). *Jour. Heredity* 32(7): 227-231. 1941.—In hexaploid timothy the following chlorophyll-deficient seedlings have been demonstrated: albino, yellow, yellowish white with green streaks, yellow green, and light green. Normal green is completely dominant. For all types, except the yellowish white, 3 apparently independently inherited homomeric factors are present. A plant is normal green if only one of these factors is heterozygous. Calculation is made of the frequency of plants heterozygous for chlorophyll deficiencies and for the probable amt. of spontaneous selfing in open-pollinated single spaced plants of a local Norwegian timothy strain. In timothy 3 factors have been found, supporting the view that polyploidy is the basis of homomery.—*From auth. summ.*

3594. WEXELSEN, H. (*Felleskjøpets stamsedgaard, Hjellum, Norway.*) Selection and inbreeding in red clover and timothy. *Imp. Agric. Bur. Joint Publ.* 3. 93-114. 1940.—Selection in red clover was begun in Norway in 1924, and the program has now expanded to include many fundamental studies. Inbreeding by selfing is no longer attempted because of the scarcity of self-fertile plants, but brother-sister matings have given rise to many inbred families. Inbreeding had a depressing effect on rate of germination, vigor of seedlings, growth rate of seedlings, mature-plant vigor, variability, persistency, and pollen quality. Through inbreeding it was possible to obtain plants which bred true for various abnormal recessive characters, disease resistance, and short corolla tube. Inbreeding may serve as a preliminary means of evaluating families in a strain-building program or as means of obtaining lines pure for disease-resistance or other specific characters. A few strains are now being multiplied. The work with timothy was begun in 1928, progeny being obtained by self-pollination, open-pollination, and cross-pollination between selected plants without emasculation. The inbreeding program with selfing has been seriously restricted by the drop in self-fertility, despite the selection for this character. Inbreeding also lowers vigor and productivity. It was calculated from plants

segregating for chlorophyll-deficient seedlings that the amt. of natural crossing is probably < 10%. Selection for good phenotypes has proved ineffective; few such plants were of superior breeding value. Several strains have been built from 2 to 5 promising families each, and 1 such strain is being multiplied for distribution.—S. S. Atwood.

3595. ZAUMEYER, W. J., and L. L. HARTER. (U. S. Dept. Agric., Beltsville, Md.) Inheritance of resistance to six physiologic races of bean rust. *Jour. Agric. Res.* 63(10): 599-622, 7 fig. 1941.—Four crosses involving 6 vars. or strains of beans and 6 physiol. races of bean rust (*Uromyces phaseoli typica*) were investigated to determine the mode of inheritance of resistance. Results proved that resistance to races 1 and 2 in the bean hybrids investigated was due to a single Mendelian factor. Possibly other genetic factors may be involved in the resistance of the hybrids inoculated with races 6, 11, 12 and 17. Resistance was shown to be dominant in the hybrids inoculated with races 1, 2, 6 and 12 and incompletely dominant in those inoculated with races 11 and 17. Severely variegated plants inoculated with race 6 showed immunity whereas those mildly variegated showed a lesser degree of susceptibility than normal plants. This may have been due either to the physiol. behavior of the host and the fungus or to modifying genetic factors or to a combination of these. It is possible that a major gene may govern resistance within the resistant classes in the hybrids inoculated with races 11 and 12 and a similar factor susceptibility within the susceptible classes. Minor modifying factors may be responsible for the variable degrees of resistance and susceptibility found within the major classes. Transgressive segregation occurred in the hybrids inoculated with race 11 since one-fourth of the F_2 plants showed more resistance than the less susceptible parent. The data deal only with the inheritance of seedling plants grown under greenhouse conditions.—W. J. Zaumeyer.

ANIMAL (EXCEPT MAN)

3596. BAUM, HAROLD M., and KENNETH L. CARTWRIGHT. (Biol. Lab., Anheuser-Busch, Inc.) A new fur pattern variation in rats. *Jour. Heredity* 32(9): 295. 1 fig. 1941.—A color pattern in which a unilateral white area covers the antero-dorsal portion of the head is recorded for the first time. Attempts are in progress to determine whether or not it is a true mutation.—L. M. Dickerson.

3597. BRIDGES, PHILIP N. (Columbia U.) A revision of the salivary gland 3R-chromosome map of *Drosophila melanogaster*. *Jour. Heredity* 32(9): 299-300. 1 fig. 1941.—A new edition of C. B. Bridges' 1935 cytological map is presented extending the 3R map in number of lines found, length of chromosome, and correlation of gene positions. The revision is a composite of a large number of drawings of chromosomes from selected aceto-carmine smears of the larval salivary glands. The present map contains 1178 bands, and represents a chromosome 519 μ long, as compared to the old map with its 725 bands and chromosomal length of 275 μ . A number of genes are located on the cytological map within narrow limits.—P. N. Bridges.

3598. BUTENANDT, ADOLF, WOLFHARD WEIDEL, und ERICH BECKER. α -Oxytryptophan als "Prokynurenin" in der zur Augenpigmentbildung führenden Reaktionskette bei Insekten. *Naturwiss.* 28: 447-448. 1940.—Previous investigations of the authors had shown that cynurenin, a derivative of tryptophane, can induce formation of eye pigment in the light colored vermilion *Drosophila melanogaster* as well as in the red eyed (a)-*Ephesia kuehniella*. According to Kotake, 2 intermediates are formed during the physiol. degradation of tryptophane to cynurenic acid: α -oxytryptophane and cynurenin. The authors assumed that the difference in eye color between the wild type and the light eyed forms of *D. melanogaster* or *E. kuehniella* consisted in the ability of the one to produce the chain of reactions leading from tryptophane to cynurenin, and the inability of the mutants to do so. If that were true, it should be possible to substitute α -oxytryptophane (= "prokynurenin") for cynurenin in the experiment. α -Oxytryptophane had only recently been isolated by Wieland and Witkop. It was found to be active both in *Drosophila* and *Ephesia* after inj. or implantation. Cynurenin as well as α -oxytryptophane and 2 derivatives of cynurenin, namely cynurenic acid and decarboxycynurenin, were all shown to be

inactive in the cinnabar mutation of *Drosophila*. The function of the genes v^+ and a^+ is supposed to lie in the activation of an enzyme system which brings about the oxidation of the tryptophane molecule into its physiol. derivatives.—S. Glaecksohn-Schoenheimer.

3599. CREIGHTON, MARGARET, and W. R. B. ROBERTSON. (State U. Iowa.) Genetic studies on *Chorthippus longicornis*. *Jour. Heredity* 32(10): 339-341. Frontispiece. 1941.—The inheritance of certain color patterns of *C. longicornis* was studied. Four patterns were found to be detd. by genes which act as multiple alleles but which may actually be 2 series of closely linked alleles. *C. longicornis* has been identified with the English species *C. parallelus* by Hebard; but it differs from *C. parallelus* as descr. by Sansome and La Cour with respect to the more common color patterns, the length of the growth period, the number of eggs laid per pod, and the development of long elytra.—Margaret Creighton.

3600. EFROIMSON, V. P. [Determination of the mutation rate in the silkworm.] [With Eng. summ.] *Izvestiya Akademii Nauk SSSR, Otdelenie Matematicheskikh i Estestvennykh Nauk, Seria Biol. (Bull. Acad. Sci. URSS. Cl. Sci. Math. et Nat. Ser. Biol.)* 1940(5): 688-705. 1940.—Study of > 5,000 *Bombyx* crosses showed sex-linked embryolethals to be rare, none being found for 4,622 X-chromosomes. This may result from extensive inert regions within the X-chromosome or from the homology of considerable parts of the X- and Y-chromosomes. Frequency of embryolethals in the autosomes was shown to be of the order of 2.5% of the gametes: 512 gametes, i.e., 13,824 autosomes, were analyzed. This mutation rate and the high conc. in the silkworm of harmful recessive genes are discussed in relation to selection and hybrid production. Heterosis is to be expected from the crossing of different stocks of this organism.—From auth. summ. by J. T. Baldwin, Jr.

3601. ERWIN, WILLIAM GRADY. (Michigan State Coll.) A genetic study of dental caries in the albino rat (*Rattus norvegicus*). *Univ. Microfilm Publ.* 157. 1-83. 1940. Pr. \$1.04.—Hunt and Hoppert have carried inbreeding to the 6th generation in a strain susceptible to dental caries and to the 4th generation in a resistant strain. Progeny tests indicate that the resistant line is highly heterozygous, and that the susceptible line probably still contains a very few genes for resistance. Results in F_1 , F_2 and backcrosses indicate that multiple factors are involved, and that the factors for resistance are cumulative. The number of these factors was not detd. There was some evidence that 2 or more of these genes for resistance are complementary, and that 1 or more of the genes are sex-linked.—From *Microfilm Absts.*

3602. GOODRICH, H. B., G. A. HILL, and MYRON S. ARRICK. (Wesleyan U.) The chemical identification of gene-controlled pigments in *Platypoecilus* and *Xiphophorus* and comparisons with other tropical fish. *Genetics* 26(6): 573-586. 1941.—A comparative study has been made of pigments present in color patterns in 2 groups of related aquarium fish including mendelian vars. of 2 of the spp. In *P. maculatus* and in *X. helleri* (Poeciliidae) the red color controlled by gene *R* (genetics as determined by Gordon) does not belong in the melanin series but is due to the pigment erythropterin. The yellows which are controlled by an independent gene are produced by 2 related compounds, zeaxanthin and lutein. In presence of *R* the erythropterin appears in granular form at the periphery of cells apparently homologous to xanthophores of yellow types and which retain a yellow center, thus forming a xantho-erythrophere. In *rr* types the red pigment is much restricted or absent and yellow pigment is present. In *Macropodus opercularis*, *Colisa latipinnis*, and *Colisa fasciata* (Osphronemidae) the oranges and yellows are due to violaxanthin and lutein; in *Betta splendens* yellows are luteins and reds are erythropterin. In *Oryzias (Aplocheilus) latipes* yellow is due to lutein only. Identifications were made by the chromatographic adsorption method. Illustrated with Kodachrome photomicrograph.—H. B. Goodrich.

3603. HARMAN, MARY T., and ANNIE ALICE CASE. (Kansas State Coll.) Genetic aspects of pigment production in the guinea pig. *Genetics* 26(5): 474-486. 3 fig. 1941.—The process of pigment formation as observed in skin

and hair of fetal and adult guinea pigs is correlated with the theory of color inheritance as presented by Bogart and Ibsen. Skin and hair in fresh condition and in fixed, stained and unstained specimens were studied microscopically. The following color-determining genetic factors were considered. The extension series *E*, *e^r* and *e*; Black and Chocolate: *B* and *b*; The "albino" series: *C*, *c^d*, *c^r* and *c^a*. The earliest stages of pigment formation in hair and skin were seen in fetuses of 43-day copulation age. Black, chocolate, red and colorless pigment granules were found in the medulla and cortex of the hair and in the epidermis. In every case the color of the hair corresponded to the color of the granules in it. The colorless granules of white hair may or may not be homologous to the colored granules. Diffuse reddish pigment was seen only in the cortex of the fully formed hair in association with black, chocolate or red granular pigment.

—M. T. Harman.

3604. HARNLY, MORRIS HENRY. (New York U.) Flight capacity in relation to phenotypic and genotypic variations in the wings of *Drosophila melanogaster*. *Jour. Exp. Zool.* 88(2): 263-273. 1941.—The flight capacity of 8 genotypes including the vestigial locus was tested. Sibs of each genotype were reared at suitable intervals between 16° and 32° C. The wing phenotype varied from "vestigial" to "nicked" or "normal" with the temp. interval for each genotype. Flight capacity varied with both the phenotype and the genotype of the animal tested. Flight was found dependent on the presence of a minimum amount of the "normal" wing ("ragged" to "notched") and on the genotype of the "ragged" winged individuals. Of phenotypes with wings large enough to support them in flight 2 genotypes made no attempt to use them, 1 tried but failed, and 5 attained controlled flight. The data demonstrate that the alleles at the vestigial locus together with the temp. experienced during development determine both the amt. and form of the wings and the neuro-muscular mechanism and through these the flight capacity of the animal.—Auth. (courtesy Wistar Bibl. Serv.).

3605. HUTT, F. B. (Cornell U.) Genetics of the fowl. 15. Multiple spurs, a mutation linked with duplex comb. *Jour. Heredity* 32(10): 357-364. 5 fig. 1941.—Multiple spurs, a breed characteristic in Black Sumatras, were found to be caused by a dominant gene, *M*. Affected ♂♂ have 3-5 spurs at and below the site of the usual single spur. The mutation is readily recognizable in ♀♀ and in newly-hatched chicks of both sexes by the absence of the spur papilla normally occurring in single-spurred fowls and the presence of 3 or more enlarged and flattened scales. Tests for linkage proved *M* to be independent of marker genes in 4 autosomal linkage groups, but linked with the gene, *D*, causing duplex comb. This establishes the 5th autosomal linkage group to be discovered in the fowl. The 2 genes show about 28% of crossing over. The mutation is useful for further linkage studies because it is dominant, manifested in both sexes, and recognizable in newly-hatched chicks with an accuracy of over 98%.—F. B. Hutt.

3606. JEFFREY, FRED P. (Agric. Exp. Sta., New Brunswick, N.J.) Hereditary microphthalmia in the domestic fowl. *Jour. Heredity* 32(9): 310-312. 1 fig. 1941.—Hereditary bilateral microphthalmia resulting from the action of a single Mendelian recessive gene was observed in an inbred strain of Barred Plymouth Rocks. Sex linkage was not involved. During the 1940 hatching season 4 ♀ breeders mated to 1 ♂ produced 196 normal to 60 microphthalmic embryos. The microphthalmic gene also affected the structure of the single comb by producing a thickening or doubling in the posterior region. This gene is semi-lethal in respect to the % hatch of fertile eggs and a true lethal in respect to early life of the chick.—F. P. Jeffrey.

3607. JENNINGS, H. S. (U. California.) Genetics of *Paramecium bursaria*. II. Self-differentiation and self-fertilization of clones. *Proc. Amer. Phil. Soc.* 85(1): 25-48. 3 fig. 1941.—Originally all members of a clone are of the same mating type; hence they do not conjugate together. At very long intervals (about 2,000 culture days), a clone may undergo self-differentiation into 2 mating types, which then conjugate (self-fertilization of the clone). In any clone self-differentiation yields in all cases the same 2 mating types, one of which is the original type of the clone. Different clones, even originally of the same mating type,

may yield different sets of 2 types, so that the combination of 2 types produced by any clone is characteristic for it. In Variety I, with 4 mating types A, B, C, and D, all the 6 possible combinations have been observed: AB, AC, AD, BC, BD and CD. The 2 mating types produced by self-differentiation of a clone may each by renewed self-differentiation produce again the same 2 types. The 2 clones produced from one by self-differentiation differ from each other in (1) mating type; they may also differ (2) in size and form of the individuals; (3) in rate of fission; (4) in readiness to conjugate. The population collected from a given locality often consists of just 2 types, either of which may by self-differentiation produce the other. By conjugation of the 2 mating types resulting from clonal self-differentiation, additional mating types are produced. In Var. I, a clone of type D has been observed to produce thus all the 4 types (A, B, C, D). Clones of type A, B, or C have each produced under observation 3 of the 4 types of the variety. Many of the pairs produced by self-fertilization die without reproducing, and this proportion increases as self-fertilization is repeated one or more times. Through self-differentiation and self-fertilization the sexual reactions of a clone culture may become changed in a number of different ways.—From auth. abst.

3608. KIKKAWA, HIDEO. (Imp. Sericult. Exp. Sta., Suginamiku, Tokyo, Japan.) Mechanism of pigment formation in *Bombyx* and *Drosophila*. *Genetics* 26(6): 587-607. 13 fig. 1941.—The mechanism of pigment formation in the eggs and various organs of *Bombyx* is quite similar to that known in *Drosophila*, *Ephesia* and other insects. Biochemical studies have been carried out on *Bombyx* and *Drosophila*. The presence of kynurenine and its derivatives + chromogen and + chrome was ascertained. Kynurenine was detected by the Otani-Honda method from the white-I eggs of *Bombyx*, and + chromogen from normal and various color mutant eggs by Ehrlich's diazo reaction method. In *Drosophila* kynurenine was detected in the cinnabar pupae, and + chromogen in the wild and some mutant type pupae. The vermilion mutant lacks both kynurenine and + chromogen. These findings, in combination with those by Butenandt et al. in *Drosophila* and *Ephesia*, suggest the following system as to the pigment formation in the insects: Tryptophane → α-oxytryptophane → kynurenine → + chromogen → + chrome (pigment). The mechanism of the conversions from tryptophane into + chrome is assumed to be due to the presence of enzymes which are controlled by the genes like *v⁺*, *cn⁺* in *Drosophila*, and those like *W_I* and *P* in *Bombyx*. The exptl. methods used are briefly described.—Hideo Kikkawa.

3609. NABOURS, ROBERT K., FLORENCE M. STEB-BINS, and W. R. B. ROBERTSON. (Kansas Agric. Exp. Sta.) Autosomal and sex chromosomal translocations and viability in *Apotettix eurycephalus* Hancock. *Jour. Exp. Zool.* 88(2): 239-260. 1 pl. 1941.—Two x-ray induced translocations of chromatin have been found in *A. eurycephalus*. In one the exchange was between the 1st and 4th autosomes, with depletion in amt. of chromatin for the former and augmentation for the latter. In this case there was a mutual exchange of centromeres. Both aberrant autosomes survived for the expts. The other exchange was between a 1st autosome and the sex chromosome; with increase in chromatin and an extra centromere (traction fiber attachment) for the latter. In this case the donor autosome, deprived of its indispensable centromere, did not survive. Thus, an autosomal dominant color pattern was changed over into a sex-linked character. The diagram-like, dominant color patterns involved were not perceptibly altered phenotypically by the changed chromosomal relationships and environment. The anomalous gametes survived and functioned, the embryos developed and hatched, but by the time the color pattern markers could be recorded, differential mortality was conspicuously evident. The variability in viability due to chromosomal deficiencies, accretions, extra centromere, complements and, perhaps, locations ranged from a low ratio of 99.43 normal:0.57 donor, deficient first autosome, through many other combinations to a high ratio of 50.97 normal:49.03 donor complemented by the very piece (accretion to the 4th autosome) which left the deficiency. The cytological observations corresponded with the genetical results.—Auth. (courtesy Wistar Bibl. Serv.).

3610. NEEL, JAMES V. (*Dartmouth Coll.*) A relation between larval nutrition and the frequency of crossing over in the third chromosome of *Drosophila melanogaster*. *Genetics* 26(5): 506-516. 1941.—Frequency of crossing over in the *h-e^s* region of the 3rd chromosome of ♀♀ was significantly increased in flies which during the larval stage had been removed from all food from the 70th hr. of egg-larval life until the time of puparium formation (development at 26° C). Except for the first few days, this increase in the amt. of crossing over was consistently apparent throughout the entire 26-day period that the ♀♀ were under observation. The increase was distributed along the entire portion of the 3d chromosome studied; the possibility of a maximum effect in the region of the centromere remains open. In both the control and the exptl. flies, the relation of crossing-over to age was characterized by an initial high in the frequency of recombination, followed by a sharp decrease and sustained low.—James V. Neel.

3611. OWEN, RAY D. (*U. Wisconsin.*) Reciprocal crosses between the guinea and the domestic fowl. *Jour. Exp. Zool.* 88(2): 187-215. 2 pl. 1941.—Among 258 eggs laid by domestic hens (*Gallus domesticus*) from 1-8 days after insemination with guinea (*Numida meleagris*) semen, 36 (14%) were fertile. The % of fertility of different domestic hens differed significantly. All but 2 of the embryos from this cross died before 4 days of incubation. The 2 exceptions were dying when candled on the 4th day, and were killed and fixed for histological study. The dead embryos could be divided into 2 classes of approx. equal frequency, the first including those which died in the head-process stage, and the 2d those which died after the circulatory system had developed. Among 201 eggs laid by guinea hens inseminated with semen from domestic cocks, 16 (8%) were fertile. The frequency curve of dead embryos showed 2 peaks, the first before 4 days of incubation, and the 2d late in incubation. Five embryos were killed and fixed for histological study. 2 of these were abnormal in head structure. There were 7 ♂♂ and 3 ♀♀. The testes were abnormal in several respects, paralleling in detail the previously described abnormalities of the adult testes. The medullary portion of the ovaries greatly predominated; the cortical region was thin and apparently sterile.—Auth. (courtesy *Wistar Bibl. Serv.*).

3612. SALISBURY, G. W. (*Cornell U.*) The inheritance of equine coat color. The basic colors and patterns. *Jour. Heredity* 32(7): 235-239. 1941.—Data from stud-book matings of Shetland ponies show that the mode of inheritance of the basic colors is similar to that reported for horses. White mane and tail found in some chestnuts and sorrels are produced by recessive genes and are inherited independently of body color, though dependent for expression on the absence of a gene for black. The position of gray and roan in relation to the basic colors is discussed. The gene for dominant white spotting is widespread in this breed. The occurrence of dominant white is reported.—Auth. *summ.*

3613. SCHWARZ, VICTOR. Pruefung der Wirkung der Mutation *dec* bei *Ptychopoda* durch Augentransplantationen. *Naturwiss.* 28: 399-400. 1940.—The mutation *dec* changes the eye color of the wild type of *P. seriata* from blackish brown into light yellow. It is not homologous to the mutation "a" in *Ephestia*. Implantation of wild-type testes or ovaries does not produce darkening of the eyes of *dec* hosts. These same organs, however, produce *a⁺*-hormone: when transplanted into light-eyed (*a*)-*Ephestia* hosts, they bring about pigmentation of the eyes. Parts of the eye anlage were transplanted between *dec* and wild-type *Ptychopoda* and between *dec* *Ptychopoda* and *a*-*Ephestia* one day after pupation. The resulting eyes were thus composed of parts of different mutant strains of *Ptychopoda* and even different species (*Ephestia* and *Ptychopoda*). The wild-type part of the eye (*dec⁺*) became pigmented without affecting any pigmentation in the eyes of the *dec*-host. The *dec*-part of the eye stays unpigmented but brings about pigmentation in the *a*-*Ephestia* host eye. Evidently the eye cells of butterflies produce *a⁺*-hormone, and *dec*-eyes are not able to form pigment, although they themselves contain *a⁺*-hormone, even when exposed to the influence of the body fluid of wild-type *Ptychopoda* and *Ephestia*. The behavior

of the mutation *dec* proves it to be different from cinnabar in *Drosophila* also.—S. Gluecksohn-Schoenheimer.

3614. STURKIE, PAUL D. (*Cornell U.*) Studies on hereditary congenital baldness in the domestic fowl. I. Embryological and physiological bases of the character. *Jour. Morph.* 69(3): 517-535. 7 fig. 1941.—The gross effect of the recessive gene which produces the character is manifested in chick embryos at 10 to 11 days by the appearance of blebs over the cerebral hemispheres and eyes; however formation of bleb begins at 8 days. At 15-16 days the bleb fluid has been absorbed, leaving a smooth bald area which remains throughout life. The bleb fluid which separates the dermis and epidermis prevents the downgrowth of epidermis into dermis which is necessary for feather formation. The bleb fluid is not cerebrospinal fluid (Bonnie's explanation in mice) since fluid from the brain could not be traced up into the bleb. Furthermore, the epithelium of the choroid plexuses showed no evidence of excessive elaboration of cerebrospinal fluid. Bleb fluid appears not to result from excessive filtration of blood vessels (Plagens' explanation in mice) nor from ruptured vessels, since the vessels were normal and the blood cell counts of normal and blebbed embryos were not significantly different. Whatever its source, bleb fluid most likely does not initiate the separation of the skin layers; rather, its accumulation is likely a consequence of the separation, which is thought to be due to inherent defects of the epidermis.—Auth. (courtesy *Wistar Bibl. Serv.*).

3615. STURTEVANT, A. H., and E. NOVITSKI. (*California Inst. Tech., Pasadena.*) The homologies of the chromosome elements in the genus *Drosophila*. *Genetics* 26(5): 517-541. 1941.—The 6 elements represented by X, IIL, IIR, IIIL, IIIR, and IV of *D. melanogaster* retain their identity in the species studied. They are designated by the letters from A to F, in the order given. The existing literature is reviewed, and the homologies established, for the previously published systems of nomenclature in *affinis*, *algonquin*, *anamassae*, *azteca*, *miranda*, *pseudoobscura*, *simulans*, *virilis*. The chromosome groups found in these spp. are due to rearrangements of these elements as wholes (except in the case of element A in *anamassae*), and such rearrangements are the result of translocations in heterochromatic regions. With the exception just noted, there is no clear evidence that any element has changed its content of loci in any of the species studied. Inversions have been frequent in the process of specific differentiation. A mathematical analysis of the consequences of successive inversions is shown to lead to the conclusion that the sequences found in *melanogaster* and *pseudoobscura* are no more alike than might easily result from chance.—A. H. Sturtevant.

3616. SUOMALAINEN, ESKO. Vererbungsstudien an der Schmetterlingsart *Leucodonta bicoloria*. *Hereditas* 27(3/4): 313-318. 1941.—In the 2 forms of *L. bicoloria* the basic wing color is snow white. Form *typica* is characterized by orange-yellow flacks. In general, ♂♂ have more pigment than ♀♀. The aberrant forms, *albida* and *unicolora*, lack the orange-yellow markings; the former has insignificant black flacks on the fore-wing, the latter is snow white.—Orange-yellow ♀♀ were collected in S. Finland. The 2 types of progeny, 11 orange-yellow and 6 snow white, were used in 16 crosses: orange-yellow × white, orange-yellow × orange-yellow, white × white and reciprocal. The author concludes that the orange-yellow individuals of the original collection were *AA* or *Aa*; all white individuals were *aa*. There is much variation in the degree of black markings in the white forms. The author could not tell from his data whether this was due to phenotypic variability or polymeric factors.—Form *typica* is the only one in western and middle Europe. The *aa* forms have an easterly distribution, and in many regions, e.g., Finland and E. Asia, they predominate. In other words, a naturally occurring recessive gene mutation has displaced the dominant in certain regions, cf. Goldschmidt and Fischer (1922) on *Argynnis paphia*.—R. M. Love.

3617. WRIGHT, SEWALL. (*U. Chicago.*) Tests for linkage in the guinea pig. *Genetics* 26(6): 650-669. 1941.—Data are presented in which 10 genes of the guinea pig (*S E A C F P B R M* and *Px*) are tested for possible link-

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age in every possible pair among themselves (in multiple crosses) and for possible partial sex linkage. None of these genes exhibits either total or partial sex linkage. One probable case of linkage was found. Genes *R* (rough fur) and *Px* (monstrous polydactyly) gave $42.08 \pm 2.17\%$ recombination or 3.65 times the standard error on the hypothesis of independence. In no other case was there significant evidence of linkage. Excluding the case of *R* and *Px* and a few data in which classification was seriously doubtful, there was a total of 10,881 of the recombination classes in 21,867 or 49.76% recombination. Including all data, the av. amt. of recombination was 49.47%. A multiple factor condition (occurrence of 4 toes on the hind feet instead of the normal 3) was tested for possible linkage with all of the above genes except *Px* which also determines polydactyly. Other expts. have indicated that 3 or 4 major factors are responsible for normal polydactyly. The data suggest probable linkage of one of these with *A*. There are some other irregularities in the data but no clear indication of linkage with any of the others or with sex.—*Sewall Wright*.

3618. ZIMMER, KARL G. Zur biophysikalischen Analyse des Vorgangs der Tötung von *Drosophila*-Eiern durch Strahlung. *Biol. Zentralbl.* 60(5/6): 287-298. 3 fig. 1940.—About 40 papers supply data which show that the killing of *Drosophila* eggs by X-rays, γ rays and fast neutrons follows an S-shaped curve with increasing dosage, similar to that required by the quantum-hit theory for a reaction which requires several hits. The killing is independent of the wave length. The dose for killing 50% of the eggs is dependent on ionization density. The half-value dose changes with increasing age of the developing eggs and decreases with increasing temp. during the time of radiation. The data are not exact enough to show whether a single sensitive spot must be hit several times or whether there are several sensitive targets which must be hit each once for the lethal effect to occur. The quantum hit theory does not allow a deeper insight into the nature of the primary process, but it nevertheless shows that the statistical nature of the absorption process exerts an influence, in addition to the original variability of the biological material. Killing by u.v. more nearly follows an exponential relation typical for a reaction produced by a single hit.—*A. H. Hersh*.

MAN

3619. ANDREWS, JAMES C., and KATHLEEN C. ANDREWS. (U. N. Carolina.) Hereditary aspects of cystinuria. *Jour. Elisha Mitchell Sci. Soc.* 56(2): 329-332. 1940.—The incidence of cystinuria in 2 families is reported. Each family shows certain unusual features.—*J. C. Andrews*.

3620. FORD, NORMA, and ARNOLD D. MASON. (U. Toronto.) Taste reactions of the Dionne quintuplets. *Jour. Heredity* 32(10): 365-368. 1941.—The Dionne quintuplets, who are a monozygotic set and hence have a common heredity repeated in 5 persons, were tested for taste when 6 yrs. and 10 mos. old. Test papers were used which had been dipped in solns. of common salt, 5.9%; citric acid, 7.8%; saccharine, 0.3%; quinine, 0.8%; and phenyl-thio-urea, 0.3%. The taste reactions of the quintuplets compared favorably with those of children of 7 yrs. Each quintuplet was a "taster" for phenyl-thio-urea.—*Authors*.

3621. GOLDSMITH, WILLIAM M. (U. Dubuque.) Bilateral fenestrae in the parietal bones. More cases of the "Catlin" mark. *Jour. Heredity* 32(9): 301-309. 5 fig. 1941.—Almost 2 decades after the writer's discovery of a family possessing unusual hereditary openings in the parietal bones, a number of similar observations were reported from both Europe and America. This literature is reviewed and discussed. Evidence from literature and new cases presented indicate that this strange human skull anomaly is not merely enlarged parietal foramina and also that it has been appearing for thousands of years, as shown in very ancient skulls, in such cases being misnamed and misinterpreted as trephining.—*W. M. Goldsmith*.

3622. GREBE, HANS. Die Häufigkeit der erblichen und nichterblichen Blindheitsursachen. *Erbarzt* 2: 1-22. 1938.

3623. KAHLER, O. H., and R. WEBER. Zur Erbpathologie von Herz- und Kreislauferkrankungen. Untersuchungen an einer auslesefreien Zwillingsserie. I. and II. Mitteilung. *Zeitschr. Klin. Med.* 137: 380-417, 507-575.

1940.—Bibliography to 1st part, 29 titles; to 2d part, 12 titles.—*Courtesy Human Biol.*

3624. LIEBENAM, LEONORE. Zwillingspathologische Beobachtungen bei Myotonia congenita. (Thomsensche Krankheit). *Zeitschr. Menschl. Vererbung. u. Konstitutionsl.* 24: 13-26. 1939.—Bibliography of 40 titles.—*Courtesy Human Biol.*

3625. MATUS, S. (U. Cape Town.) The Mongol spot in the Cape coloured. *S. African Med. Jour.* 15(7): 121-125. 1941.—A general account is given of the incidence of the Mongol spot in a group of 100 Cape colored infants. The color of the spot and its history are considered, and from the anthropological point of view the detailed ethnical considerations of Rivet are quoted. Of 50 babies of each sex in the group 35 ♂♂ and 40 ♀♀ showed the spot macroscopically; though the occurrence was slightly more prevalent in ♀♀, the pigmentation seemed richer in the ♂♂. All but one, in which it was on the extensor surface of one leg, had the spot in the gluteo-sacro-coccygeal region and 38 of the 75 showed additional extra-sacral spots, of which the distributions are detailed. The contrast in color between the spot and the surrounding skin was marked and the size of spots varied widely. While an anthropological interpretation may be given by attributing it to some vestige of the monkey tail, the author favors a physiol. explanation based on the general metabolism of pigment. The pigment spot in the child and pigmentary changes in the mother constitute a physiol. unit, both tending to disappear after the birth, but further investigation is required before a final solution is possible of the marked difference in incidence in white and colored races.—*Douglas Harvey*.

3626. MILLER, MILTON A. (U. Hawaii.) An inherited dental anomaly in a Japanese family. *Jour. Heredity* 32(9): 313-314. 1 fig. 1941.—A 3-generation pedigree of a Japanese family in Hawaii is reported showing the inheritance as a dominant trait of an incisor tooth deficiency (lack of one lower incisor).—*M. A. Miller*.

3627. SCHADE, HEINRICH. Beitrag zur Feststellung der Häufigkeit von Erbkrankheiten. *Erbarzt* 8: 126-128. 1940.

3628. SCHADE, HEINRICH. Untersuchungen zur Frage der Erblichkeit von Mangel- und Fehlbildungen der Gliedmassen. *Erbarzt* 8: 239-256. 1940.

3629. SCHLEGEL, WILLHART S. Ein klinisch-herbiologischer Beitrag zur Frage der Asthenie. *Zeitschr. Morph. u. Anthropol.* 38: 175-209. 3 pl. 1939.

3630. SCHWEITZER, MORTON D. (Cornell U. Med. Sch.) Eponyms of hereditary diseases. *Jour. Heredity* 32(10): 351-355. 1941.—Following the lead of Keeler's paper in *Jour. Heredity*, vol. 31: the author records a similar list of 84 entries. Detailed references to the literature are given.—*L. M. Dickerson*.

3631. STEGGERDA, MORRIS, and HENRI C. SEIBERT. (Carnegie Inst. Washington, Cold Spring Harbor.) Size and shape of head hair from six racial groups. *Jour. Heredity* 32(9): 315-318. 1941.—Because of great variation in size and shape of head hair, large numbers from each individual and from several individuals of each race are necessary in order to calculate mean values of cross sections. Intra-racial variation can exceed inter-racial differences. For ages 10-19, Maya, Hopi, Zuni, and Navajo Indians have the largest and roundest hair; Negroes have large hair, also, but it is very elliptical; the Dutch have fine hair that is intermediate in shape.—*H. C. Seibert*.

3632. STURKIE, PAUL D. (Alabama Polytech. Inst.) Hypermobility joints in all descendants for two generations. *Jour. Heredity* 32(7): 232-234. 1 fig. 1941.—From the study of pedigree A, it is noted that II-4, the only member of 4 sisters showing hypermobility, and who married a normal ♂, transmitted the character to her 4 daughters and one son, all of whom exhibited the hypermobility in some or most of the joints of the body. Fingers, thumbs, toes, knees and elbows were most commonly involved. Three of her daughters who are married (to normal ♂♂) have 4 children (2 ♂ and 2 ♀), all of whom exhibit the anomaly. The parents of II-4 were normal. Pedigree B, like A, shows the presence of the trait in 3 generations; but the number of individuals involved is smaller. In generation II, only 1 of a family of 5 sisters showed the characteristic. Her parents were normal. Of her 2 children, 1, a ♀, had hypermobile joints, married a normal ♂ and transmitted

the character to her only child, a ♂. No attempt is made to set forth a factorial scheme which will explain the behavior of this trait.—*Aith. summ.*

3633. VERSCHUER, OTMAR FRHR v. Bemerkungen zur Genanalyse beim Menschen. *Erbarzt* 7: 65-96. 1939.

3634. VERSCHUER, OTMAR FRHR v. Über das Zusammentreffen von Lippen-Kiefer-Gaumenspalte mit Missbildungen der Gliedmassen. *Erbarzt* 9(1): 1-11. 1941.

3635. WADE, H. W. Heredity in susceptibility to leprosy. *Internat. Jour. Leprosy* 9(3): 353-358. 1941.—A summarized review of the older theories and several recent contributions is given, indicating that a conclusive solution can be obtained only through animal experimentation because of limitations of human data available. Demonstration of like levels of tissue resistance to the causative agent, in familial groups, has been made with puppies.—*G. A. E.*

3636. YAMAURA, A. On some hereditary characters in the Japanese race including the Tyosenese (Coreans). *Jap. Jour. Genetics* 16(1): 1-9. 27 fig. 1940.—Data are presented on the frequency and manner of inheritance in the Japanese of the shape of the eyelid, the manner of clasping the hands, the type of head hair-whorl, and the flexibility of the first joint of the thumb. It is concluded that the following are inherited as dominant characteristics: double eyelid (versus single eyelid), right fingers uppermost when the hand is clasped (vs. left fingers uppermost), dextral head hair-whorl (vs. sinistral), and absence of flexibility of the first thumb joint (vs. flexibility).—*James Neel.*

3637. YAMAURA, A. The hereditary mode of the dimple in the Japanese race. *Jap. Jour. Genetics* 16(3): 120-123. 5 fig. 1940.—5% of the Japanese have a dimple; the trait is inherited as a simple dominant.—*James Neel.*

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JOHN W. GOWEN, *Editor*

(See also Entries 3652, 3653, 3654, 4562, 4586, 5322)

3638. AVRAMI, MELVIN. Geometry and dynamics of populations. *Philosophy of Sci.* 8(1): 115-132. 1941.—Formulae are derived for the dynamics of populations in aggregates of grains of one phase growing in another phase, such as crystals, drops, bubbles, ordered and ferromagnetic domains, and other physical phenomena. In a sense living organisms are also included, as they may be regarded as grains of a new phase growing at the expense of the surrounding phase, whether living or not.—*L. J. Lafleur.*

3639. BARTLETT, M. S. The present position of mathematical statistics. *Jour. Roy. Statist. Soc.* 103(1): 1-19. 1940.—The author discusses the scope, the mathematical framework and applicability of mathematical statistics without going into many details. The paper is entirely too brief for the title.—*W. D. Baten.*

3640. CHAMBERS, E. G. Statistical calculation for beginners. viii+110p. University Press: Cambridge, 1940. Pr. \$2.

3641. DEMING, W. EDWARDS, and FREDERICK F. STEPHAN. (Bur. Census.) On the interpretation of censuses as samples. *Jour. Amer. Statist. Assoc.* 36(213): 45-49. 1941.—By historical precedence, and by law, one of the primary functions of the census is to provide a count or inventory of the population as it actually existed on a specified census date. For such purposes the census must be complete. As a basis for scientific generalizations and decisions for action, a census is only a sample. It gives data of the past, and inferences are drawn on the future. A well drawn sample will give the greatest amt. of information for the money expended. The size and type of sample to be taken depend upon the frequency of the attribute to be sampled and the previous information available. A sampling method is satisfactory for questions under consideration if it can be depended on to yield samples that will lead to the same action that would have been taken on the basis of a complete count. Any unusual situation must be considered in drawing conclusions. A sample may be preferable to a census due to shorter processing time.—*R. H. Shaw.*

3642. ECKERT, W. J. Punched card methods in scientific computation. ix+136p. T. J. Watson Astronomical Computing Bureau: New York, 1940. Pr. \$2.—The purpose of this book is to show the possibilities of the electric punched card method in scientific computation. It is designed to enable a scientist to formulate his problem so that any skilled operator of the machines can carry out the necessary computation. An introduction is followed by 7

chapters dealing with the punched card and the machines; general considerations of the punched card technique; the construction and use of special tables of tabular functions; interpolation, mechanical quadrature, and allied subjects; numerical harmonic analysis and synthesis; the multiplication of series; and the numerical solution of differential equations. The remaining 4 chapters discuss the application of the technique to astronomical problems.—*M. Keller (in Psychol. Abst.).*

3643. GEARY, R. C. The mathematical expectation of the mean square contingency when the attributes are mutually independent. *Jour. Roy. Statist. Soc.* 103(1): 90-91. 1940.—The author gives a short and neat proof for the mathematical expectation of the mean square contingency by use of the multinomial theorem and points out that the value obtained is independent of the marginal probabilities.—*W. D. Baten.*

3644. MORANT, G. M., and B. L. WELCH. A bibliography of the statistical and other writings of Karl Pearson. viii+119p. University of London: London, 1939. Pr. 6s.

3645. RHODES, E. C. Population mathematics. II. *Jour. Roy. Statist. Soc.* 103(2): 218-245. 1940.—The author continues the study of the birth function found in the first article by first considering special cases, namely birth constants in particular periods, birth functions changing by a constant amount per unit of time. In each case a formula for the birth function is obtained which is an exponential involving integrals and the root of an integral equation. After applications, solutions of the integral equation are given. The population function is treated in the last part of the paper, where the material already developed is used.—*W. D. Baten.*

3646. ZUBIN, JOHN, and MATHEW TABACK. (New York State Psychiatric Inst.) A note on Sheldon's method for estimating dysplasia. *Human Biol.* 13(3): 405-410. 1941.—Sheldon obtains a measure of dysplasia for each of his 3 body components by summing the absolute differences between each of the 10 possible pairs of component ratings over the 5 body regions. An examination of the resulting index indicates that it is arithmetically equivalent to 10 times the av. deviation around the median of the ratings plus twice the range. The standard deviation seems to be a better measure of dysplasia since the probable error of the standard deviation is easily obtainable. The method of analysis of variance is utilized to illustrate how the dysplasia of 2 individuals as well as of 2 groups can be directly compared.—*Authors.*

HUMAN BIOLOGY

(See also Physical Anthropology and Entries Negro health on Ante-Bellum plantations, 3497; Genetics of dental caries, 3601; Taste reactions of quintuplets, 3620; Catlin mark mistaken for trephining, 3621; Mongol spot in S. African Negroes, 3625; Hereditary diseases, 3630; Shape of hair, 3631; Genetic studies in Japanese, 3636; Population dynamics, 3638; mathematics, 3645; Interpretation of censuses, 3641; Body types, 3646; Social consequences of removal of offensive weapons, 3665; Neurosis in bronchial asthma, 4734; Selection and training of field investigators, 4840; Incidence of tuberculosis in white vs. colored, Tennessee, 4846; Vital index in Br. Guiana, 4850; Tuberculosis mortality, 4856; Morbidity and mortality trends in U. S., 4858)

3647. BURKS, BARBARA S. Social promotion in relation to differential fecundity. *Human Biol.* 13(1): 103-113. 1941.—In a study based on family records "socially promoted" individuals come from smaller sibships than do either individuals of similar socio-economic background who are not promoted, or individuals who are offspring of socially promoted parents. These facts would fit either Fisher's hypothesis that the fecundity of the upper socio-economic group is kept low by the heritable lower fecundity of persons promoted into the upper group, or the hypothesis that among families able to limit number of offspring voluntarily, fecundity tends to be proportional to ability to provide for offspring. In "established" families the number of offspring is fewer than in families produced by those who have attained promotion, or by those whose children are attaining promotion. This points to an environmental factor cumulative in the direction of lower fecundity as the family mores in groups of superior attainment are assimilated to an urbanized culture.—B. S. Burks.

3648. GOLDSTEIN, KURT. Human nature in the light of psychopathology. x+258p. Harvard University Press: Cambridge, 1940. Pr. \$2.50.

3649. HENRY, GEORGE W. Sex variants. A study of homosexual patterns. With sections contributed by specialists in particular fields. Sponsored by Committee for the study of sex variants, Inc. I. xxii+546p. II. vii+633p. Paul B. Hoeber: New York, 1941. Pr. \$12.50.

3650. HUMPHREYS, EDWARD J. (*Letchworth Village, Thieells, N. Y.*) Eugenical implication of recent studies in the field of mental deficiency. *Jour. Heredity* 32(9): 325-331. 1941.—The author groups current studies of genetics and eugenics which are of special significance as either clinical genetics, exptl. genetics or social genetics. Clinical and exptl. genetics bring to light many physiol. and functional deficiencies which may be of great importance to the individual and to family groups as well as to society; and of which many show specific hereditary foundations. Social genetics is the more recent development of medical genetics and is of increasing importance as the incidence of defective individuals in the general population continues to increase. It is pointed out that "Mental Deficiency" therefore means infinitely more than intellectual inferiority" and the specific deficiencies in drive, emotion, character, personality and behavior of organisms within their various societies constitute by far the most serious aspect of problems in the field of human deficiency.—L. M. Dickerson.

3651. LE GALL, A. Alcoolisme et aliénation mentale dans le Département de Morbihan. (*Alcoholism and mental disorders in the Department of Morbihan.*) Thesis: Paris, 1939.—Total admissions per yr. to the asylum in the Department of Morbihan, France, rose from 149 in 1910 to 335 in 1937. This is ascribed in part to more frequent institutionalization. Alcoholic admissions increased during the same period from 31 to 150. The % alcoholic admissions of all admissions thus increased from 20.8 to 44.8. The author concludes from this that psychosis not dependent on alcoholism is decreasing. In the period 1918-32 ♀♀ constituted between 10.5 and 27.5% of the annual alcoholic admissions. In the period 1934-37 they constituted between 25.0 and 47.6% of the alcoholic admissions. Although the sample for any one yr. is small, there is no doubt that the proportion of ♀♀ has increased markedly since 1933. Other noteworthy facts about the alcoholic admissions are that the proportion of single to married ♀♀ has doubled during the last few years; that the number of younger people admitted is rising steadily; and that a distinct occupational shift has occurred: Between 1922 and 1933 there was a slight excess of agric. workers over manual laborers, while in the period 1933-37 the agric. workers outnumbered

the manual laborers 3:1. The possibility of a shift in occupations is noted.—Courtesy *Quart. Jour. Stud. Alcohol.*

3652. LOTKA, ALFRED J., and MORTIMER SPEIGELMAN. The trend of the birth rate by age of mother and order of birth. *Jour. Amer. Statist. Assoc.* 35: 595-601. 1940.

3653. MACDOUGALL, G. G. A. Inter-war population changes in town and country. *Jour. Roy. Statist. Soc.* 103 (1): 30-51. 1940.—This article shows the trends of population movements pertaining to rural and urban districts together with the difficulties in classifications of these districts. The data pertain to Britain, England, and Wales and cover the period from 1921-1937.—W. D. Baten.

3654. RHODES, E. C. Population mathematics. I. *Jour. Roy. Statist. Soc.* 103(1): 61-89. 1940.—This paper, through the use of many integrals, finds the value of the number of births of ♀ children from N mothers at any time. The number of births at any time is a function of other functions which pertain to successive generations. Tables are presented which are used in finding the number of births at different times in the succeeding generations.—W. D. Baten.

3655. RICHTER, C. P. (*Johns Hopkins Hosp., Baltimore.*) Biology of drives. *Psychosom. Med.* 3(2): 105-110. 1941.—Claude Bernard and Cannon have shown that various physiological regulators serve the function of maintaining a constant internal environment. Richter's exptl. work indicates that the animal as a whole also plays an important rôle in this regulatory function. These total responses are commonly overlooked in the intact organism, but by eliminating the physiological regulators in rats the author brought to clear definition the "total organism responses which serve to maintain a constant internal environment." Examples of these regulatory responses are the drinking of large quantities of water by rats when deprived of the mechanism for regulating water metabolism through surgical removal of the posterior lobe of the pituitary gland; the covering of the body with large amounts of nesting material when kept in a cool room after the regulatory mechanism for body temp. control has been abolished through removal of the pituitary or thyroid gland; and the intake of large amounts of minerals, carbohydrates and fats when the respective physiol. mechanisms for mediating the metabolism of these substances have been removed by operation. Further expts. with normal rats indicate that behavioral factors also play an important rôle in maintaining an optimal internal environment in the intact organism. When given an opportunity to choose their diet from as many as 15 different substances the animals arrived at a more efficient diet than had been devised by dietary experts. The implications of the homeostatic principle for the study of abnormal and psychotic behavior are briefly discussed.—William Galt.

3656. SCHWESINGER, GLADYS C. The role of psychology in eugenics. *Jour. Heredity* 32(9): 319-324. 1941.—The author recognizes 2 categories of clinical eugenics: (1) clinical eugenics, which encompasses the eugenic problems of the individual person, couple or family; and (2) social eugenics, concerned with the eugenic problems of a group of families or a nation. The relationship of research psychology to the objectives and methods of eugenics research and the clinical application of results are discussed. The evening up of environmental inequalities is an excellent research technique for isolating genetic variables as well as an expression of social justice.—L. M. Dickerson.

3657. WOODWORTH, R. S. Recent results on heredity and environment. *Trans. New York Acad. Sci.* 3(2): 30-35. 1940.—The use of twin studies to attack the problem of heredity and environment dates from Galton's work. The "twin method," developed particularly in Germany, and

the "co-twin control" method, used extensively in the USSR, have been valuable especially in the investigation of physical traits. In the U. S. studies of identical twins reared apart lead to 2 tentative conclusions: "a large difference in educational environment can produce quite an appreciable difference in tested intelligence," and "the differences in intelligence found in an ordinary community are not accounted for to any great extent by differences in home and school environment." Heredity and environment

interact: different heredity levels are generally coupled with correspondingly different environments; the type of genetic constitution frequently determines external conditions to a considerable extent. A complicating factor in these investigations is the possibility of prenatal malnutrition and birth injury. The need is stressed for careful case studies of foster children, as opposed to the simple "notation of the child's I.Q. at different ages."—F. W. Finger (*in Psychol. Abst.*).

ANIMAL BEHAVIOR

(See also Entries Drives, 3655; Weather and bird migration, 3676; Photoperiodism and bird migration, 3778; Food selection for vitamine requirement, 3939; Appetite in bovine acetonemia, 5011; Sunfish, 5947; Breeding activity of toads, 5962; Enemy-recognition by rattlesnake, 5968; Mating in newts, 5986, in sage grouse, 6074; Grouse, 5999; Bird migration, 6009; Courtship in birds, 6014, and display in birds, 6069; Social nesting behavior and neuro-endocrine adjustment, 6022; Social hierarchies in pigeon, 6025; Homing of birds, 6055; Anting by birds, 6063)

3658. ENGELMANN, CARL HEINRICH. Versuche über den Geschmackssinn des Huhns. IV. Der Einfluss von Körngroße und Körnerform auf die Beliebtheit einiger Getreide Arten bei Zwerghühnern. *Zeitschr. Tierpsychol.* 4: 204-218. 1941.—Offered several sizes of kernels, a hungry bantam picked out first the larger, and when partly satisfied, took the smaller ones.—*Courtesy Auk.*

3659. MAIER, N. R. F. Abortive behavior as an alternative for the neurotic attack in the rat. (Film.) 320 ft., silent. Psychological Cinema Register, Lehigh University: Bethlehem, Pa., 1939. Pr. \$16.—This film is a sequel to the picture *Experimentally produced neurotic behavior in the rat*. The exptl. situation is arranged so that, instead of forced jumping to the stimulus window, the rat can use several substitute or abortive reactions, such as climbing on top of the starting box, jumping to the near wall, or clinging to the edge of the apparatus. When these abortive or escape reactions are prevented, the neurotic pattern appears in violent form.—*L. F. Beck (in Psychol. Abst.)*

3660. MAIER, N. R. F., and J. B. KLEE. Studies of abnormal behavior in the rat. VII. The permanent nature of abnormal fixations and their relation to convulsive tendencies. *Jour. Exp. Psychol.* 29(5): 380-389. 1941.—Persistent unadaptive position habits (fixations) which had previously been developed in a group of rats by frustration were found to survive a strenuous testing program in which this response was repeatedly punished. Even convulsions produced by metrazol failed to disturb the fixations. The experimentally produced fixations are therefore regarded as permanent in nature. Individuals inclined to develop fixations appear no more subject to exptl. "neuroses" than animals not so inclined. The fixations when present, however, seemed to be an aid to the animal in escaping from the "neurosis" producing situation utilized in this study. This situation employed a discrimination problem in which the animal was forced to take punishment and the fixated position habit gave the animal a way of reacting, even though the reaction was unadaptive. Metrazol, even in subconvulsive doses, showed some tendency to increase the susceptibility to "neurotic" behavior. The effects were temporary, however, and other behavior in the problem situations remained unaltered.—*N. R. F. Maier.*

3661. SANDERS, F. K. (*Univ. Mus., Oxford.*) Second-order olfactory and visual learning in the optic tectum of the goldfish. *Jour. Exp. Biol.* 17(4): 416-434. 8 fig. 1940.—Observations by others that fore-brain and tectal (not involving valvula cerebelli) lesions in Teleosts do not disturb motor activity or equilibrium were confirmed on *Carassius auratus*. Reaction time studied over suitable successions of training periods showed that: (i) The intact animals learn to swim to concealed food when an illuminated disc is presented; (ii) presentation of an olfactory stimulus (amyl acetate) with the optic stimulus, during reinforcement of the latter with food as "reward," causes addition of the olfactory stimulus to the stimulus complex needed for minimal reaction time; (iii) 5 animals exhibited learning curves in reaction to a situation in which—after preliminary training with the optic stimulus with food as reward—the olfactory stimulus was given with the optic stimulus as reward (this is regarded as second-order learning comparable to second-order conditioned reflexes); (iv)

in 4 of these animals (the 5th serving as sham-operative control), removal of large areas of the optic tectum or (in one case) a cut at its ant. border caused marked disturbances in the 2d-order learned pattern. Since histological evidence is lacking for forward projections from the optic lobes into olfactory centers, it is argued that the change of "state" during 2d-order olfactory-optic learning must occur in a mechanism of the optic lobes, due to descent of impulses from the telencephalon.—*C. V. Winder.*

3662. STONOR, C. R. Courtship and display among birds. xv+139p. 57 pl., 2 fig. Country Life Ltd.: London, 1940. Pr. 8s. 6p.—This work brings together from many sources a series of 58 magnificent photographs showing some of the most beautiful and spectacular displays of birds, including those of the bustard, frigate-bird, bird-of-Paradise, grouse, heron, albatross, grebe, wagtail, penguin, ruff, lyre-bird and kagu; the text describes these displays and touches on their uses. Courtship is said to be "of profound importance as an 'awakener' prompting the bird to begin its breeding activities, keeping it keyed up when once it has started." The displaying ♂ stimulates himself as well as the ♀. Visual stimulation, acting through the pituitary gland, may mediate this, and is compared to the effect of a work of art on a man, or an incomplete clutch of eggs stimulating a ♀ to continue laying. However, it is also admitted that the attracting of a mate is often most important. Mutual display, continued after pairing, helps to keep the birds "up to the mark" in their nesting duties. Communal display increases advertisement value, and provides greater stimulation for each bird; lack of this might be a factor in the sudden extermination of a bird species reduced in numbers. Display grounds increase the effect of displays. The possible social and recreational use of some of these is mentioned, still a rather problematic question. The comparative studies of some displays and the structures used in them are an interesting feature. The displays and adornments of a closely related group of birds of paradise can be arranged in a series of increasing complexity, illustrating their possible phylogeny; in this group evolution of display has kept pace with evolution of adornment. In game birds the displays show less variation; in this group the evolution of display has not kept pace with the evolution of adornment. Stonor concludes that in some cases evolution of form preceded that of display. Many other generalizations are scattered through the book, but the discussion is not well rounded. Birds tend to breed when conditions are most favorable and environmental factors, notably light, appear to control this. Once started, display may have an additional effect, but probably it is more important in this phase in bringing the pair together and aiding physical contact. Some generalizations are too sweeping, as that all brilliant colors have a use, as those of fruit pigeons for protection; and that "the greatest thing a bird is up against . . . is that it must . . . blend and tone in with its surroundings."—This book is meant to acquaint the general public with some of the most beautiful and spectacular phenomena of bird life and both text and photographs serve their purpose well. There is a brief foreword by P. R. LOWE.—*From review by A. L. Rand (courtesy Auk).*

3663. WALKER, ERNEST P. (U. S. Nation. Zool. Park.) Animal behavior. *Ann. Rept. Smithsonian Inst.* 1940. 271-312. 18 pl. 1941.—A popular account of a naturalist's observations of the behavior of certain mammals and birds (with occasional comment on certain fish, reptiles and amphibia), featuring their food-getting, combat and defensive behavior, means of avoidance of enemies, relation to water supply, care of young, voice and communication.

3664. WARDEN, C. J. Problem solving in monkeys. (Film.) 420 ft. 16 mm. Columbia University: New York, 1938. Pr. \$30.—Covers the behavior of the *Cebus* and *Rhesus* monkeys on 2 complex tasks: (1) selecting the proper string among several arranged in patterns on a platform adjacent to the test cage, (2) use of tools (rakes) in securing food placed beyond normal reach. The latter includes the following stages: (a) use of a single rake, (b) use of short rake to get another one long enough to reach the food, (c) continuing the series up to 8 rakes, in a complex series performance, in securing the reward. (First

demonstration of such complicated tool-using capacity in monkeys.)—C. J. Warden (*in Psychol. Abstr.*).

3665. WOODBURY, ANGUS M. (U. Utah.) Changing the "hook-order" in cows. *Ecology* 22(4): 410-411. 1941.—In semi-pioneer days of southern Utah, cows fed loose in corral developed a "hook-order" in which the "boss" hooked all others out of the way; the 2d hooked all but the boss; the 3d hooked all but the 1st and 2d; and so on to the last one who was hooked by all the rest. Artificial change in the "hook-order" was produced by removal of horns from the most offensive hookers. This not only reduced offensive power of the hookers but also reduced fear in members lower in the scale, which led to a rearrangement of the order with the hornless ones near the bottom. Removal of horns from all cows produced still further reorganization of the social scale based on a "bunt-order" which was much more peaceful. Reduction in offensive weapons produced reorganization of the social scale.—A. M. Woodbury.

ECOLOGY

Editors

ORLANDO PARK, *General Animal Ecology*
 G. D. FULLER, *General Plant Ecology*
 CHANCEY JUDAY, *Hydrobiology (Oceanography, Limnology)*

FREDERICK A. DAVIDSON, *Ecology of Wildlife Management—Aquatic*
 W. L. MCATEE, *Ecology of Wildlife Management—Terrestrial*

ROBERT G. STONE, *Bioclimatology, Biometeorology*

(Other entries in this issue: [GENERAL AND ANIMAL ECOLOGY]—Genetic consequence of transplantation to unaccustomed climate, 3565; Flight capacity of *Drosophila* mutants, 3604; Courtship and display among birds, 3662, 6077; Accommodation of *Arenicola* to Mg-conc. levels, 3767; Photoperiodism and bird migration, 3778; Forests and ants, 5376; Cotton weevil infestation, India, 5606; Dispersion of *Harmolita*, 5607; Seasonal rhythm in population of sludge fly, 5642; Land shells of Guatemala, 5834; Black widow spider, 5860; Environmental factors affecting growth of trout, 5954; Sparrow in California, 6003; Social nesting behavior and neuro-endocrine adjustment, 6022; Game kill trends, California, 6046; Adaptation (concealing coloration) in deer mouse races, 6099; Mammals of lava fields, New Mexico, 6105. [PLANT ECOLOGY]—Rainfall and soil erosion, 3668; Shrub pasture management under low rainfall, Australia, 4602; Bracken and bovine haematuria in Br. Columbia, 5095; Phytogeogr. of ferns in Florida, 5098; Phenology of Hungarian plants, 5103; Wisconsin grasses, 5128; Willows of Rumania, 5135; Adaptations in *Mesembryanthaceae*, etc., 5174; Pollination of *Asclepias*, 5196; Root development in New Zealand pasture plants, 5202; Range seeding by airplane, 5208; Crop-plant-weed competition, 5217; Erosion on karst lands, Kentucky, 5237; Iodine in S. Carolina soils and rocks, 5251; Erosion in Rhode Island, 5253; Soils in Tasmania, 5255; Malaya, 5304; Light and temp. as affecting seed germ, Douglas fir, 5342; Disease- and climatic injury to exotic forest trees, 5347; Reproduction of hemlock in Michigan, 5356; Rainfall interception and stream flow in pine plantation, 5363; Forest soils of Scotland, 5370; Polyembryony in *Pinus*, 5372; Blooming in ponderosa pine, 5375; Strong concs. of Na_2SO_4 affecting tomato plants, 5433; Germination in *Pyrola*, 5454, of *Poa* bulblets, 5455; Pollen-tube cultures, 5457; Environmental effects on tuberization in wild potato, 5460; Mycorrhizas, 5467; Dispersal of sap-stain fungi, 5546; Antibiosis of bacteria and fungi, 5595; Bee flowers of India, 5683)

GENERAL

3666. FREI, M. Der Anteil der einzelnen Tier- und Pflanzengruppen am Aufbau der Buchenbiozönose in Mitteleuropa. *Ber. geobot. Forschungsinst. Rübel, Zürich* 1940: 11-25. 1941.—An account of the number of spp. of the major groups of plants and animals occurring in the M. European beech-forest, mainly based on available literature. Due to the favorable nature of the leaf-mould as a substratum, some groups are very well represented, e.g., Holobasidiomycetes, Apterigota and Myriapoda. —Knut Faegri.

BIOClimATOLOGY, BIOMETEOR-OLOGY

(Other entries in this issue: Genetic consequence of transplantation to unaccustomed climate, 3565; Environment and "solid stem" in wheat, 3585; Weather and population dynamics, 3680; Effect of high temps. on poikilotherms, 3682; Refrigerated storage, 3947; Environm. temp. and digestion in cold-blooded vertebrates, 4011, affecting properties of hog fat, 4584; Temp. effects on hibernation, 4034; Shrub pasture management under low rainfall, Australia, 4602; Climatic factors affecting milk production, 4625; Therapeutic effect of ionized air in tuberculosis, 4756; Chilling as affecting resistance to influenza, 4789; Atmosp. pollution, Dublin, 4839; Fruiting of slime mold, 5085; Phenology of Hungarian plants, 5103; Rainfall and pasture composition, Australia, 5207; Weather and maize yields, Indiana, 5230; Phenology, Argentina, 5281; Malaya, 5304; Growth of vegetables, and photoperiodism, 5309; Low-temp. fruit storage research in S. Africa, 5324; Frost injury to Lychee, Florida, 5336; Light and temp. as affecting seed germ, Douglas fir, 5342; Disease- and climatic injury to exotic forest trees, 5347; Germination of *Poa* bulblets, 5455; Environmental effects on

Let's All Pull Together

During these difficult times unity of purpose is essential—both in our national life and in our pursuit of knowledge. Waste and duplication of effort should be eliminated. Resources should be pooled to produce the most effective results at the lowest cost.

We, of course, are thinking particularly of the importance to biologists of maintaining a complete and uninterrupted record of the biological literature. Right now, some of the biological societies are contemplating, and others are actually conducting, their own abstracting services. With half the funds thus expended *Biological Abstracts* could guarantee a complete and prompt coverage of all the important literature to all biologists. How much better it would be to have one all-inclusive, efficient service, than a number of smaller services none of which possibly can be complete or entirely adequate. We have the organization and experience to maintain such a service—but we need the support of the biological societies and individual biologists.

tuberization in wild potato, 5460; Penetration of mulberry leaves by sunlight, 5480; Cotton weevil infestation, India, 5606; Bioclimatic relation of diapause in spruce sawfly, 5634; Rel. hum. and viability of silkworm eggs, 5701; Seasonal rhythm in sewer fly, 5895; Breeding activity of toads, 5962)

3667. ALI, B., and S. N. NAQVI. (*India Meteorol. Dept.*) Correlation between frost and the preceding meteorological conditions. II. (Jaipur). *Sci. Notes India Meteorol. Dept.* 8 (92): 91-98. 1941.—Multiple correlation coefficients and regression equations relating minimum temp. and any 2 of the dew point, dry-bulb and wet-bulb temp. at 1600 hrs. local time and maximum temp. of the preceding afternoon have been computed from the records for clear nights at Jaipur during the months Nov.-Feb. of the yrs. 1918-29. The 2 factors of wet- and dry-bulb temp. gave regression equations with standard errors of prediction ranging from 2.7°F in Nov. to 4°F in Jan., and it is claimed yielded satisfactory predictions in 94% of cases. Discrepancies arose mainly from westerly moving atmospheric disturbances, the approach of which might be foretold from synoptic charts.—J. W. Hopkins.

3668. BLUMENSTOCK, DAVID I. Rainfall characteristics as related to soil erosion. *U. S. Dept. Agric. Tech. Bull.* 698. 1-44. 5 fig. 1939.—A study was made of rainfall characteristics as related to soil erosion in the southern Great Plains, the southern prairie grassland region, and the mountain-Piedmont-coastal area of W. Virginia and Virginia of the U. S. In the Plains region, Amarillo, Texas, and Dodge City, Kans., were chosen for analysis. In the Prairie region Wichita, Kans., Oklahoma City, Okla., and Fort Worth and Dallas, Texas, were used, and in the mountain-Piedmont-coastal area Elkins, W. Va., Lynchburg, Va., and Washington, D. C., were selected. Some of the

rainfall characteristics studied were: monthly and annual amts., seasonal storm frequencies, rainfall-intensity factor (such as rate per hr.), rainfall duration (length of storm periods such as under 3 hrs., 3 to 6 hrs.), length of periods without precipitation, and diurnal variations in amts.—*R. M. Wehing.*

3669. BONSMA, J. C. (*Dept. Agric. and Forest., Pretoria, S. Africa.*) The influence of climatological factors on cattle. *Union S. Africa Dept. Agric. and Forest. Bull.* 223. 1-22. 3 maps, 5 fig. Reprinted from *Farming in South Africa*, Oct. 1940.—High temps. increase respiratory count and body temp. of moderate temp. beef-cattle breeds and interfere with normal feed utilization and breeding. The Afrikaner breed has thicker skin, shiny coats, short hair of greater density (5000 per. sq. inch; cf., 3000 for "exotic" breeds). The desirability of developing a beef-cattle breed adapted to the tropics is emphasized.—*E. Mortensen.*

3670. CRAIG, J. I. (*Meteorol. Off., Melbourne.*) Calculation of accumulated temperature. *Jour. Australian Inst. Agric. Sci.* 7(1): 31-32. 1941.—By use of a formula a theoretical value is obtained which gives a useful approximation to the actual accumulated temps. This may be used to indicate the broad temp. zones in Australia to which new crops, whose temp. requirements are known, should be adapted, provided moisture, soil conditions, and other factors are favorable. A check on the reliability of the formula and its application to diff. classes of climates seems required. This is a summary of a complete paper on this subject.—*O. E. Sell.*

3671. FINDIKLIS, THEOKLITOS TH. *Peri tes thermokrasias tou Helladi. Tomos 1, Meros B, Thermokrasia edaphous Athelon.* [The temperature of the soil in Greece, V. 1, Sect. B., The temp. of the soil at Athens.] [In Greek with Fr. summ. 196p. 12 fig. Monograph: Athens, 1940.—This monograph, by the Director of the Agric. Meteorol. Section of the Greek government, is the first part of a general study on the temp. of Greece under preparation. Daily, monthly, and annual temp. changes on bare and sodded soil surfaces and at various depths (to 1.2 m.) were measured and compared with each other and with air temps. Bare ground showed considerably higher annual averages than the sodded soil as well as greater variability, although the annual curves of the 2 are nearly parallel and not far apart, the greatest differences being in summer. The lag of temp. change with depth is shown, amounting at certain depths to as much as a month behind the surface. The absolute maxima of the bare soil and sod surfaces did not coincide with the time of absolute maxima of air temp., although the absolute minima for these 3 came on the same date.—The monograph contains a useful 19-page bibliography.—*R. Burhoe.*

3672. LÜDI, W., und B. STÜSSI. (*Geobot. Inst. Rübel, Zürich.*) Die Klimaverhältnisse des Albisgebietes. *Veröffentl. Geobot. Inst. Rübel* 18: 1-69. 9 Illus. 1941.—The Albis district (ca. 25×30 km.) comprises a low mountain chain in the direction N-S, reaching 8-900 m. altitude. The following meteorological data are given for several stations (max. 20), extending over the yrs. 1932 to 1936: precipitation, maximum and minimum temp., duration of sunshine, cloudiness, fog and wind. Pp. 10-59 contain a discussion of the main data. Despite the comparatively confined area the meteorol. conditions are highly variable, precipitation being higher on the W. side of the mountain, etc. An attempt to express numerically the character of the climate (Klimacharakter) shows that the Gams formula of hygric continentality does not hold true. The original Emberger formula is also useless when winter temps. come below 0° , but if temps. are expressed in degrees above absolute zero, the data obtained by the Emberger formula are quite satisfactory, the sequence of stations being the same as can be found by other means. Although the investigation was made for a comparison between meteorological data and vegetation, no data on the latter are given.—*Knut Faegri.*

3673. PETERSEN, W. F. The effect of cold, heat and weather on the human being. *Arch. Phys. Ther. X-Ray, Radium* 21: 522- 1940.—The effects of cold, heat and weather changes on normal and diseased individuals are discussed. The physiologic adjustment necessitated by weather alteration is apt to find expression in unusual symptoms, in change of function or in actual pathologic develop-

ment in organs which are inadequate. The author made daily chemical detns. of the blood and urine, and other clinical and physiol. observations on normal and sick individuals and has attempted to correlate his findings with the daily meteorologic changes.—*Courtesy Allergy Abst.*

3674. RIEMERSCHMID, GERTRUD. (*Union Dept. Publ. Health, S. Africa.*) South African solar radiation survey, 1937-38. *Ondersteepoort Jour. Vet. Sci. and Animal Indust.* 15(1/2): 343-430. 6 fig. 1940.—Solar radiation, and "cooling temp." (measured with a Büttner-Pfleiderer frigorigraph) were recorded at 6 stations. During 9 mos. of the yr., the greatest amt. of radiation was secured in the highveld; during Dec., Jan., and Feb., at Capetown. The greatest amt. of radiation was secured during Nov. or Dec., 1937: the smallest, during July, '37, and June, '38. Amts. were usually in accordance with the sun's altitude. At the inland stations the rapid decrease of the cooling temp. in the afternoon continued after sunset but at the coastal stations the drop was much more gradual after sunset. The monthly av. cooling temp. in winter was distinctly lower at the inland than at the coastal stations.—*J. F. Ruff.*

3675. RIEMERSCHMID, G. The climatic strain in human beings as indicated by cooling-ball temperature measurements in the Union of South Africa. *S. African Med. Jour.* 15(14): 267-275. 1941.—The cooling-ball temp. is based on purely physiol. considerations and is employed to measure the effectiveness of a temp. to which an individual is exposed. In part 1 the instrument evolved by Pfleiderer and Büttner of Kiel is descr. from its physical aspect in comparison with the naked human body which it practically equals in absorption both for infra-red and solar radiation. The cooling effect of the climate may also be measured by Hill's katathermometer and by the frigorimeter of Dorno and Thilenius but the cooling-ball represents a closer relationship between the human body and climate than do these instruments. The inventors have investigated the strain on the heat-regulating mechanism of the body produced by various cooling temps. and have correlated cooling-ball temp. with mean skin temp., heat production and heat loss through perspiration in the human body. A combined curve for these allowed the definition of a dose-unit which represents the physiol. strain resulting from a given exposure at a known cooling-ball temp. In addition, a scale of sensation, 0-7, detd. by expts. on 500 healthy persons, was prep'd. for particular ranges of cooling-ball temps. from below 20° to over 48° for sensations ranging from very cold through cold, cool, indifferent, comfortable, warm and hot to very hot. Part 2 gives the results of the application of this scale to cooling-ball temps. obtained at 6 stations, Johannesburg, Bloemfontein, Nelspoort (Karoo-limited data), Durban, Port Elizabeth and Cape Town. Some of the conclusions are that at Johannesburg the "very cold" hrs. predominated over any other range and that "cool" and "cold" hours were also frequent: at Bloemfontein "cool" hrs. were most frequent and "very cold" and "cold" hrs. were next in frequency: at Durban "cool" hrs. were far in excess of all others while "very cold" were only 1% and "cold" 9% of all hrs.: at Port Elizabeth "cool" hrs. were predominant while "cold" and "indifferent" hrs. were very frequent and equal in amt.: at Cape Town "cold" and "cool" hrs. were equal and predominant and "very cold" hrs. were 9% of the total. The data are also recorded according to value in "frigori-therapy" and "thermo-therapy," that is, according to whether cooling-ball temps. are below or above 37° , the temp. at which the strain on the heat-regulating mechanism is minimal. From the point of view of sun-bathers and patients day-time readings are more important and a comparison is made between S. African measurements and those for Nairobi (tropical highland climate) and the island of Föhr (North Sea), a European sea climate. In Europe the ranges 3, 4 and 5 are preferably used for therapy and the % of day-time frequency of these for the individual stations are Johannesburg 61, Bloemfontein 55, Nelspoort 29, Durban 80, Port Elizabeth 71, Cape Town 68, Nairobi (5 mos.) 75 and Föhr 19. Ranges 0, 1 and 2 with marked over-cooling were 12, 15, 16, 9, 22, 25, 13 and 81% while ranges 6 and 7 with marked over-heating were 7, 11, 4, 7, 4, 4, 0 and 0% respectively for the stations in the order quoted.—*Douglas Harvey.*

3676. RITCHIE, J. An analysis of the influence of weather upon a migratory movement of birds. *Proc. Roy. Soc. Edinburgh* 60: 299. 1940.—The 1921 invasion of Bohemian waxwings (*Bombycilla garrulus*) into Denmark and Gt. Britain occurred during 3 weeks when the barometric pressure in Scandinavia was high; it was preceded and followed by low pressures. The migration proceeded from an area of high pressure towards one of low pressure during anticyclonic conditions. Temp. was "normal" for the season. Of 13 "waves" of migration, 12 started under overcast skies; with 12 the wind was easterly or southeast. It is suggested the birds started south and were blown to Gt. Britain.—*Courtesy Bird-banding.*

3677. RUEDY, R. Absorption of light and heat radiation by small spherical particles. I. Absorption of light by carbon particles. *Canadian Jour. Res. Sect. A. Phys. Sci.* 19(10): 117-125. 1941.—From Mie's classical theory of the action of small spherical particles on plane waves of light, the expression giving the loss of light due to absorption and scattering is reduced to the formula involving only Bessel functions of orders given by half integral values. The result is used for calculating the absorption by small carbon particles whose diam. is comparable with the wave-length of the incident light, particles that can be measured only by interference methods. When the diam. is $< 0.2 \mu$ the coeff. of absorption decreases toward the red end of the spectrum. The reverse is true for 0.3 and 0.4 μ particles.—*Auth. abst.*

3678. SINGER, C. I. Climate and military preparedness. *Jour. Amer. Med. Assoc.* 115: 1421-1424. 1940.—Experiences in the World War, the Russo-Finnish war, and the Norwegian campaign have demonstrated the importance of proper climatic adaptation of the soldier. On the basis of these experiences the author makes, among others, the following recommendations for the U. S. Army: Recruits should be trained under the least favorable climatic conditions of northern and southern regions to provide troops hardened for subarctic rigor and tropical mugginess; studies should be made on the vestimental climate of the soldier by frigometeric methods, with different clothing materials and series of cutaneous temp. readings under these materials; artificially controlled climatic testing laboratories should be installed for the selection of men for special tasks; the climate of the site of training should be considered in relation to the climate of the proposed site of action of a specific military unit; and a special climatic advisory board should be created.—*S. Ansbacher (in Psychol. Abst.).*

ANIMAL

3679. ADAMSON, A. M. (*Imp. Coll. Trop. Agric., Trinidad, B.W.I.*) Laboratory technique for the study of living termites. *Ecology* 22(4): 411-414. 1941.—The device of confining animals in a narrow space between glass plates can be used for observations and expts. on all kinds of termites. The space between the plates, which should scarcely exceed the height of the insects, is partially filled by wood, soil, etc., in which the termites burrow but cannot escape from view. For soil-dwelling spp., the upper glass cover is made up of several pieces, e.g., microscope slides, which can be removed and cleaned one by one, when obscured by soil and feces, without much shock to the colony. Colonies of up to several thousand individuals of many Neotropical spp., especially of *Heterotermes*, *Coptotermes*, *Nasutitermes*, *Microcerotermes* and *Anoplotermes*, have been maintained with low mortality for many months. The same method has been used for young colonies headed by pairs caught while swarming. Most of the technique is simple and adaptable.—*A. M. Adamson.*

3680. DE BACH, PAUL, and HARRY S. SMITH. (*Citrus Exp. Sta., Riverside, Calif.*) Are population oscillations inherent in the host-parasite relation? *Ecology* 22(4): 363-369. 1941.—Populations of housefly puparia and one of its parasites, *Mormoniella vitripennis*, were allowed to interact under certain simplified conditions. The populations of both host and parasite followed closely the theoretical predictions of Nicholson and Bailey through 7 "generations." The expts. support the conception that population oscillations are inherent in the host-parasite or predator-prey interaction.—*From auth. summ.*

3681. DREYER, WILLIAM A. (*U. Cincinnati*), and WILLIAM A. CASTLE (*Mary Washington Coll.*). Occurrence of the bay scallop, *Pecten irradians*. *Ecology* 22(4): 425-427. 1941.—9 living specimens of the bay scallop, *P. irradians*, were collected from localities on Long Island during Aug., 1935-1940; of these, 5 were adult specimens taken in Shinnecock Bay in 1940. The scallop seems to have survived in localities where eel-grass persists.—*W. A. Dreyer.*

3682. FRAENKEL, G. S., and G. V. B. HERFORD. (*Imp. Coll. Sci. and Tech., London.*) The physiological action of abnormally high temperatures on poikilotherm animals. II. The respiration at high sublethal and lethal temperatures. *Jour. Exp. Biol.* 17(4): 386-395. 4 fig. 1940.—O₂ consumption of *Caliphora erythrocephala* Meigen larvae was detd. at 42°C. on a modified Barcroft manometer under various O₂ partial pressures for 3 hrs. (or until death). Basal O₂ uptake by immobile larvae (head end removed) was fairly constant for about 1 hr., then declined; by mobile (intact) larvae it declined from the initial reading, presumably due to "settling down" and paralysis. Initially, O₂ uptake varied in the same sense as O₂ pressure up to 100%; but after $\frac{1}{2}$ to 1 $\frac{1}{2}$ hrs., it was usually higher at 20 and 10% O₂ than at 100 (and 5%). As judged by subsequent deaths, after 30 min. exposure to 42°C., damage appears to be done before basal O₂ consumption falls. High temp. caused greater subsequent mortality in 2-7½% or 80-100% O₂ than in air. It is concluded that death at high temp. is not due to lack of O₂.—*C. V. Winder.*

3683. JACKSON, C. H. N. (*Tsetse Res. Dept., Tanganyika Tty.*) The economy of a tsetse population. *Bull. Ent. Res.* 32(1): 53-55. 1941.—A summary of results obtained from marked *Glossina morsitans*. During the hottest season ♂♂ live on an average about 2 weeks and in the rainy season about 5-6 weeks; ♀♀ live "possibly twice" as long as ♂♂. Flies of both sexes live in restricted ambits, the ♀♀ having rather larger ambits than the ♂♂. The estimated population of a sq. mile is about 1,000 ♂♂, 2,000 ♀♀. The population in the fire-exclusion area lagged behind that of the control until the end of the year, when it about equaled that of unmarked flies.—*A. J. Basinger.*

3684. KANO, TADAO. Zoogeographical studies of the Tsugitaka Mountains of Formosa. 145p. 12 pl., 27 fig. Shibasawa Institute for Ethnogr. Researches: Tokyo, 1940.—With lists of birds and other animals characteristic of the various life zones.—*Courtesy of Auk.*

3685. SCHLECHTMAN, A. M., and J. B. OLSON. (*U. California, Los Angeles.*) Unusual temperature tolerance of an amphibian egg (*Hyla regilla*). *Ecology* 22(4): 409-410. 1941.—Early developmental stages of this tree frog were subjected to various temps. for periods of time ranging from 2 to 6 hrs. Gastrulae and neurulae survive freezing temps. for 12 hrs. at least, and 4-5°C. for as long as 8 days. Early stages (from the blastula through the tail-bud stages) are viable after exposure to 33°C. Abnormalities appear in specimens treated at 35°-38°C.; 39° is the lethal temp. for all stages studied.—*A. M. Schlechtman.*

3686. SMITH, F. G. WALTON. (*U. Miami.*) Sponge disease in British Honduras, and its transmission by water currents. *Ecology* 22(4): 415-421. 1941.—Investigations of heavy damage to the commercial sponge plantations at Turneffe, Br. Honduras, showed that sponges were infected by the filamentous micro-organism held responsible for the Bahamas epidemic. Analysis of the physical and biol. conditions at the time of the outbreak disclosed no other factor beyond that of high salinity which might have contributed to the loss. Observations tend to support the belief that the Turneffe damage was caused by the spread of the Bahamas disease organism by means of water currents running counter to the Gulf Stream between Key West and Br. Honduras.—*F. G. W. Smith.*

3687. SPENCER, DONALD A. (*U. S. Dept. Interior, Fish and Wildlife Serv.*) A small mammal community in the Upper Sonoran Desert. *Ecology* 22(4): 421-425. 2 fig. 1941.—A study of the small mammal community near Tucson, Arizona, in which particular emphasis is placed on the movement and drift of the seven most common rodents. As one feature of the study a 5-acre area was trapped free

of all small mammals at 2-week intervals. Thus 1254 mammals of 22 spp. were taken from the 5-acre plot in a 10-month period. The least movement (drift) occurred during March and April, the greatest in July and Aug. *Neotoma albicula*, the most numerous species in the habitat, has the longest intensified summer drift period, while *Perognathus baileyi* has the shortest. *Dipodomys merriami*, 2d in point of numbers in the habitat, has the highest sustained annual drift. There is a post-hibernation drift-lag of approx. 2 months in the case of several spp. of *Perognathus* and of *Citellus tereticaudus neglectus*. Besides the data on annual drift, daily activity was recorded electrically on a tape chronograph from numerous electrical traps placed about wood rat dens. Changing food habits, following the annual vegetative cycle, were recorded. The composition of the small mammal community in the Tucson area was compiled from wide-spread trapping operations.—D. A. Spencer.

3688. WELLS, G. P., ISABEL C. LEDINGHAM, and MARY GREGORY. (Univ. Coll.) Physiological effects of a hypotonic environment. II. Shock effects and accommodation in cilia (*Pleurobrachia*, *Mytilus*, *Arenicola*), following sudden salinity change. *Jour. Exp. Biol.* 17(4): 378-385. 1 fig. 1940.—Observation of comb-plates of *P. pileus*, gill filaments of *Mytilus*, and nephridia of *A. marina* revealed depression of activity followed by accommodation, on sudden downward or upward changes in salinity of the medium. Sensitivity varies among types of cilia and spp. On passing from 100% sea water to < 25%, short abfrontal cilia of *Mytilus* exhibited about 1 min. of acceleration before the depression. Below 33-35% sea water disintegration of gill or nephridium occurs. Cells swelled and escaped, often with cilia still beating. Quantitation of mechanical activity by movement of a wt. and of water content by wet and dry wts. of pieces of gill showed swelling to occur very rapidly in 30% sea water; but activity accommodation continued long after and so cannot be an adjustment of water content.—C. V. Winder.

3689. PARK, THOMAS, ELLA VIRGINIA GREGG, and CATHARINE Z. LUTHERMAN. (U. Chicago.) Studies in population physiology. X. Inter-specific competition in populations of granary beetles. *Physiol. Zool.* 14(4): 395-430. 1941.—Three spp. of granary beetles, *Tribolium confusum*, *Gnathoceros cornutus* and *Trogoderma versicolor*, are cultured in the same microcosm and counts of total population size and larval, pupal and imaginal composition are taken at 30-day intervals. The expts. consist of (a) control populations where each of the 3 spp. is cultured singly; (b) matings where all 3 spp. are cultured in all combinations of twos with both spp. seeded initially in equal density, and (c) matings where 1 sp. is introduced in numerical superiority over its competing mate. The following general conclusions describing the end-result of the competition may be listed: If *Tribolium* gets well established as a population it drives out *Gnathoceros*; if *Tribolium* populations are reduced to a low point by some type of epidemic infection or, presumably, some other mechanism, *Gnathoceros* gets the upper hand and *Tribolium* becomes extinct; *Tribolium* always drives out *Trogoderma* irrespective of initial imaginal densities; *Gnathoceros* usually drives out *Trogoderma*, if the former is seeded initially in equal or higher densities, but *Trogoderma* is the winner when started in a higher density than *Gnathoceros*.—Auth. summ.

3690. YOUNG, R. T. (Scripps Inst., La Jolla, Calif.) The distribution of the mussel (*Mytilus californianus*) in relation to the salinity of its environment. *Ecology* 22(4): 379-386. 1941.—Expts. with the sex cells and larvae of *M. c.* show their susceptibility to salinities < 29.6%. Fertilization usually occurs readily at 21.5%, but survival of the larvae at this conc. is distinctly lower. There is great variability in fertilizability of the eggs and viability of the larvae. Absence of this mussel from quiet waters, where other conditions appear to favor it, suggests that turbulence, as well as salinity, is an important factor in determining its distribution.—R. T. Young.

PLANT

3691. BEALE, G. H., J. R. PRICE, and V. C. STURGESSION. (John Innes Hort. Inst., Merton.) A survey of antho-

cyanins. VII. The natural selection of flower colour. *Proc. Roy. Soc. Ser. B: Biol. Sci.* 130(858): 113-126. 1941.—The anthocyanins have been identified in the flowers, fruits or leaves of approx. 200 spp. of plants. The results have been combined with earlier data, to ascertain the frequency with which derivatives of the 3 main anthocyanidin types occur as flower pigments among the spp. so far examined. Classification of the natural habitats of the spp. examined shows that pelargonidin derivatives predominate in the flowers of tropical and subtropical spp. while delphinidin derivatives are the commonest in temperate and alpine plants. The colors of tropical and subtropical flowers containing cyanidin or delphinidin derivatives are generally redder than those of temperate species containing the same anthocyanin.—Red-flowered forms evidently have a greater survival value than blue in most tropical plants. On the basis of the anthocyanin present in the flowers of 32 spp. of *Tulipa*, the genus falls into 2 groups in accordance with the morph. classification.—Auth. abst.

3692. BOND, RICHARD M., and ATWELL M. WALLACE. (Soil Conserv. Serv.) Invasion of a protected area by exotic plants. *Sci. Month.* 53(5): 470-472. 1 fig. 1941.—The flora of Anaho Island in Pyramid Lake, Nev., was studied and several exotic spp. were found. These exotic forms could easily have developed from seed which were carried by birds, wind or water. How they were able to survive in competition with the native vegetation, however, is a much more difficult question to answer. Several possibilities are suggested.—F. R. Hunter.

3693. COILE, THEODORE S. Soil changes associated with loblolly pine succession on abandoned agricultural land of the Piedmont Plateau. *Duke Univ. Sch. Forestry Bull.* 5. 1-85. Illus. 1940.—This study was concerned with measurement of soil changes that accompany forest succession on abandoned agric. land of the Georgeville soil series of the Piedmont Plateau. The successional series consists of pioneer weeds, broomsedge, pine (loblolly), pine-oak, and the white oak-black oak-red oak climax forest type. Analyses of the chemical composition of litter of various spp. indicated that the highest level of soil fertility should be expected in the surface soil under old loblolly pine stands with their characteristic understory of dogwood. This was found to be true with respect to exchangeable Ca and available N in the surface soil. A more favorable C-N ratio was found in old pine stands than in either young stands or in the climax oak-hickory forest. Water percolation was greatest in the older pine stands. Volume-weight, air-space, and water-holding capacity of the fine-textured surface soils did not change significantly with forest succession. Concn. of small roots in the surface soil was found to increase with stand development and succession, reaching its greatest magnitude in the climax forest. The high conc. of roots near the soil surface in forest stands tends to prevent the establishment of loblolly pine (*Pinus taeda*) seedlings, which have a superficial root system when young. In contrast, seedlings of the oaks and hickories have a deeply penetrating taproot which extends below the surface zone of intense competition in existing stands, and these species are able to reproduce under forest canopies in this region.—T. S. Coile.

3694. DOUGLASS, A. E. (U. Arizona.) Crossdating in dendrochronology. *Jour. Forest.* 39(10): 825-831. 7 fig. 1941.—Crossdating, an initial process in tree-ring work by which accurate ring chronologies may be built for dating purposes, for climatic information or for certain ecological problems, is defined and illustrated. Methods of cross-dating, its interpretation and significance, and its character as differentiated from correlation are discussed and a bibliography is included.—S. H. Spurr.

3695. FOSCUE, EDWIN J. (Southern Methodist U.) Land utilization in Costa Rica. *Sci. Month.* 53(5): 427-439. 2 fig. 1941.—A description of the physiographic and climatic characteristics of Costa Rica and the development of its land.—F. R. Hunter.

3696. FRANKTON, C., and L. C. RAYMOND. (Macdonald Coll., Quebec.) Pasture studies. XX. An ecological and crop survey of Stanstead County. *Sci. Agric. [Ottawa]* 22(3): 178-194. Map. 1941.—A transect method was employed in estimating the grazing resources and general utilization of land for a typical county in the Appalachian region

(Eastern Townships) of Quebec. Pasture-land comprised 40.4% of the cover, tilled land and hay 26.5% and woodland and swamp 33.1%. The good grasses and clover were only slightly over a quarter of the pasture area with the balance under *Danthonia spicata* and invading plants such as *Spiraea tomentosa*, *Agrostis alba* (red top) and *Festuca rubra* were far more abundant than *Poa pratensis*. Forest covered only 6.9% of the county although smaller trees and scrub totalled 24.7%. Woodland observations suggest that the Eastern Townships are in the "hemlock, white pine, northern hardwood" forest described by G. E. Nichols.—*L. C. Raymond.*

3697. FRASER, G. K. (Macaulay Inst. Soil Res., Aberdeen, Scotland.) Vegetation survey of waste land in relation to the establishment of woodlands (with special reference to the north-east of Scotland). *Forestry* 14(2): 59-70. 1940.—Crude assumptions as to the value of plants as indicators of the suitability of ground for the growth of trees should be given up since they are neither scientifically sound nor practically free from serious error. Our knowledge of plant ecology and of the inter-relations which exist between vegetation, soil and potential tree growth is not accurate enough to be of exact diagnostic value in the planting of waste ground; but careful study of vegetation and of the sites on which it occurs enables the forester to recognize recurring changes in ground conditions and to systematize his experience of the results of planting these. A sketch is given of the past and present vegetation in the northeast of Scotland and of conditions under which it has developed. A description of the chief varieties of *Calluna* heath (on drier sites) and moor (on wetter sites), and of the local types which accompany these, together with general descriptions of their site conditions, forms the main section of the paper. The paper concludes with an account of the methods used in surveying vegetation for silvicultural purposes.—*G. K. Fraser.*

3698. GODWIN, H. Studies of the post-glacial history of British vegetation. III. Fenland pollen diagrams. IV. Post-glacial changes of relative land- and sea-level in the English Fenland. *Phil. Trans. Roy. Soc. London Ser. B: Biol. Sci.* 230(570): 239-303. 1 pl. 1940.—30 borings are involved in the study. The peat was boiled in 10% KOH, strained through coarse muslin, centrifuged and washed with water 3 times. 5 comparable slides were made and total pollen on them counted. The author recognizes several difficulties to make direct correlation with results from the continent, because such index trees as *Abies* and *Picea* are not found in Britain, and the oceanic climate tends to smooth out changes, making forest succession less rapid. The pollen diagrams are grouped into zones IV to VIII, representing the following: IV. Pre-boreal (birch, pine); V. Pre-boreal (pine); VI. Boreal (pine, hazel); phase "a," pine dominant; phase "b," oak exceeding elm; phase "c," *Tilia* added to oak and elm, alder increasing, pine reduced to secondary dominance; VII. Sub-Atlantic (alder, oak, elm, linden); VIII. Sub-Atlantic (alder, oak, elm, birch, beech). Pine disappears entirely, and linden almost. Unfortunately the author does not show what zones I to III represent. Much of the peat was formed under brushwood made up of alder, pine, birch and oak. This local influence is plainly shown in the pollen diagrams, thus they serve as indicators of local climatic influence by movement in land and sea level. 3 periods of dryness terminated abruptly by increasing wetness. Wetness destroyed the fen woods, and alder increased. During the wet periods oak increased on adjacent uplands. Correlations are also made with cultures of stone, bronze, iron, Roman, and modern historical ages.—*J. E. Potzger.*

3699. HAGERUP, O. Bestøvningen hos Liparis og Malaxis. [Pollination of *Liparis* and *Malaxis*.] *Bot. Tidsskr.* 45: 396-402. 14 fig. 1941.—The author has examined the autogamous *Liparis loeselii* and the entomophilous *Malaxis paludosa* in their natural habitats and gives histological and mechanical information about their pollination.—*O. Hagerup.*

3700. HANSEN, HENRY P. (Oregon State Coll.) Paleoecology of a montane peat deposit near Lake Wenatchee, Washington. *Northwest Sci.* 15(3): 53-65. 1 fig. 1941.—The peat deposit studied lies at the west end of Fish Lake, Chelan County, on the east slope of the Cascade Mts., alt. 1880 ft. The lake is a result of glaciation, but the higher

ridges nearby were not covered by the ice. The bog is at present in the Canadian life zone, close to the border of the Arid Transition. The characteristic tree of the Canadian is western white pine (*Pinus monticola*), that of the Transition western yellow pine (*P. ponderosa*). Peat samples were obtained at quarter-meter intervals. The thickness of the pollen-bearing sediments is 8.5 m. Volcanic ash crystals occur from 3.75-3.25 m. In the lowest sediments western yellow pine contributed 36% of the significant pollen; lodgepole pine 19%; and western white pine 12.5%. Lodgepole pine (*P. contorta*) gradually decreases to 5% at 6.25 m., and then fluctuates between this and 15% at the surface. White pine rapidly increases to 50% at 5.75, gradually declines to 29% at 2.5, again increases to 47% at 1.5 m., and then decreases to 13% at the surface. Yellow pine decreases sharply to 10% at 7 m., then more gradually to 6% at 5.5, increases to 36% at 2.25, diminishes to 19% at 1.25, and finally increases to 37% at the surface. The pollen profile may be interpreted as indicating a long initial period of increasing coolness and moisture, followed by a warmer and dryer period of perhaps equal length. A 3d brief and poorly defined period of increased coolness and humidity was succeeded by a final warmer and dryer period. However, the author believes that climate has not been the major, if even an important factor, in the control of post-Pleistocene forest succession in the Pacific Northwest.—*H. Wilkens.*

3701. HEINIS, FR. Die Reinacherheide. Ein Beitrag zur Flora und Vegetation des untern Birstales. *Verhandl. naturforsch. Ges. Basel* 51(2): 66-89. 1939-40(1940).—After a description of this section of Switzerland, history of previous investigations, and reports of special plants, the account becomes an ecological consideration of the following formations: the peculiar heath, the bush flora of the terrace edges, the association of *Pinus sylvestris*, the Querceto-Carpinetum, the flora of the bank of the Birs river, the weeds of cultivated soil, and the Kehrightflora at Heiligholz.—*F. W. Pennell.*

3702. HESS, ROBERT W. (Yale U.) A micrometer for growth ring analysis. *Jour. Forest.* 39(10): 871-873. 2 fig. 1941.—The instrument, incorporating a double micrometer and a moving object slide, is designed for use where 2 separate measurements must be made or accumulated over a straight line up to 2 inches long. Measurements are accurate to 1/5000 inch and a magnified image of the cross-section of the specimen permits accurate selection of the measuring points.—*S. H. Spurr.*

3703. HUMPHREY, R. R., and P. B. LISTER. (U. S. Soil Conserv. Serv.) Native vegetation as a criterion for determining correct range management and run-off characteristics of grazing lands. *Jour. Forest.* 39(10): 837-842. 6 fig. 1941.—Five conditions of the range are recognized based on the stage of depletion of the climax vegetation. For each class are given the management practices responsible for the condition, the revisions required in present management practices and the erosion or flood-control remedial measures indicated.—*S. H. Spurr.*

3704. JOHNSON, W. M., and C. H. NIEDERHOF. (Rocky Mt. Forest and Range Exp. Sta., Ft. Collins.) Some relationships of plant cover to run-off, erosion, and infiltration on granitic soils. *Jour. Forest.* 39(10): 854-858. 1 fig. 1941.—Artificial rainfall was applied to 1/200 acre plots on the watershed of the S. Platte River in central Colorado beginning in 1936. The abandoned field plant cover type produced the most run-off, valley bunchgrass an intermediate amount and mountain bunchgrass the least. Because of the extreme coarseness of the soil, plant density had no effect on run-off. Erosion was greatest on the abandoned field type and least on the valley bunchgrass type. Of the 14 plant spp. compared to bare soil, 2 spp. increased the infiltration capacity, 2 decreased it, and 10 had no significant effect.—*S. H. Spurr.*

3705. LÜDI, W. (Geobot. Inst. Rübel, Zürich.) Berghorn und Robinie als Pseudoepiphyten auf einer Robinie. *Ber. geobot. Forschungsinst. Rübel Zürich* 1940: 26-30. 3 pl. 1941.—An "epiphytic" *Acer pseudoplatanus* was proved—on the felling of the host tree—to have sent its roots through cracks in the evidently fresh wood of the host to the soil. From one of the branches the *Robinia* itself sent another root down to the soil through the same cracks.—*Knut Faegri.*

3706. LÜDI, W. (Geobot. Inst. Rübel, Zürich.) Untersuchung über die jahreszeitliche Schwankung der Bodenazidität. *Ber. geobot. Forschungsinst. Rübel Zürich* 1940: 31-51. 3 pl. 1941.—The pH and water contents of the topmost 5 cm. of soil were measured once a month for 2½ yrs. in 4 stations. The values obtained varied considerably, individual ranges between 1.02 and 2.07 units of pH. Another series comprising 1 yr. and station shows that the same is the case also in 10-15 cm. depth and in dried as well as fresh samples. No general rules could be established for the variations. The results warn against indiscriminate use of pH values.—Knut Faegri.

3707. LÜDI, W. (Geobot. Inst. Rübel, Zürich.) Die Kastanienwälder von Tesserete. Beitrag zur Soziologie der Kastanienwälder am Südhäng der Alpen. *Ber. geobot. Forschungsinst. Rübel Zürich* 1940: 52-84. 1 pl. 1941.—16 *Castanea* forests were analyzed according to the Braun-Blanquet methods and the results recorded in a table. The tree layer is generally dense (80-90%), the only constant is *Castanea*, all others are insignificant. The shrub layer is of little importance, whereas the field-layer is comparatively well developed (70-100%). Mat-forming spp., mostly grasses, are dominant; but *Luzula nivea* is the most regular. 28 spp. are constant to all 16 samples, they are mostly acidophilous and characteristic of poor soil; some few are indifferent. Correspondingly the soil is free from carbonate and rather acid, pH 4.3-5.1. The soil type is characterized as a degenerate brown soil, tending towards podsol; in some few cases a real podsol is formed.—Apart from extremes the *Castanea* communities previously descr. are of the same poor and acidophilous type. Some few examples—probably artificial—are richer.—The closest phytosociological affinities of the *Castanea* forests are found in the acid oak-forests of oceanic Europe (*Quercion roboris*). Intermediate types have been described from E. France. Acid oak-forests in Tesserete show the closest affinity with the chestnut forests. The natural relationship between the 2 communities is not clear, but if *Castanea* is considered spontaneous—which the author does, as invasion took place during the Neolithic age—they must be counted as parallels. The spreading of *Castanea* has certainly been favored by man. *Castanea* per se is not confined to poor and acid soil, and the richer types may have been cleared for cultivation. Beech probably does not enter the *Castanea* zone as a forest dominant under natural conditions, being characteristic of somewhat higher altitudes. The beech forests occurring in the lower zone are probably artificial and belong to the *Quercion*, not to the *Fagetum*. Apparently the acid chestnut-, oak- (and beech-) forests of the region comprise a phytosociologic unit belonging to the *Quercion roboris-sessiliflorae* and closely related to, but different from, the *Quercetum medio-europeum*. It is called *Querceto-Castaneetum insubricum*. A list of constant, characteristic and differential spp. is given. The type is widely distributed on the S. side of the Alps, in the Apennines, etc.—Knut Faegri.

3708. MOOR, M. (Basel, Schweiz.) Pflanzensociologische Beobachtungen in den Waldern des Chasseralgebietes (Berner und Neuenburger Jura). *Ber. schweiz. bot. Ges.* 50: 545-566. 1 fig. 1940.—Plant associations that form natural altitudinal zones in the mountains of the Bernese and Neuenburger Jura are described as, (1), a basiphilic, low oak forest belonging to the *Querceto-Lithospermetum* which lies between 500 to 700 m., (2), a high beech forest belonging to the *Fagetum typicum* extending up to about 1100 m., (3), a high beech-fir forest belonging to the *Fagetum abietosum* extending up to 1300 m. and (4), a spruce forest belt which lies between 1300 and 1400 m. at the edge of an artificial timberline. The latter resembles the *Piceion-Areal* association but actually represents a degraded *Fagetum*. Floristic changes in the herbaceous layer following introduction of spruce into a beech forest are described as a sign of degradation of the site.—W. C. Bramble.

3709. NIELSEN, ETLAR L. (U. Arkansas.) Grass studies V. Observations in proliferation. *Bot. Gaz.* 103(1): 177-181. 6 fig. 1941.—Proliferation was observed to occur in *Festuca obtusa*, *Bromus inermis*, *B. purgans*, *Phleum pratense*, *Avena sativa*, and *Panicum virgatum*. The general external morphology of the proliferation is briefly descr.

The proliferating plants were growing under relatively xeric conditions in northwest Arkansas, under very wet conditions of west-central Wisconsin; under greenhouse conditions, or under grazing.—E. L. Nielsen.

3710. POHL, FRANZ. Ueber Raphidenpollen und seine blütenökologische Bedeutung. *Oesterreich. Bot. Zeitschr.* 90 (2): 81-96. 3 fig. 1941.—Pollen grains containing raphids were found in a number of Angiosperm spp., most of them of Monocotyledons. No ecological significance was seen.—Max Onno.

3711. SCHULTZ, G. E. [A case of experimental viviparity in grass.] *Botanicheskii Zhurnal SSSR (Jour. Bot. USSR)* 24(3): 197-208. 1939.—In the polar Alpine Botanical Garden (Kola Peninsula, 67°37' north lat.) by subjecting the local form of *Deschampsia flexuosa* to the action of a 10-hr. day, there was induced in this grass both normal reproduction and the formation of shortened viviparous panicles. Transitional forms were obtained between the normal floriferous spikelets, vegetative buds and normal vegetative shoots. Apparently viviparity is not a congenital and invariable autonomous property of certain genotypes, but a result of interaction of the hereditary material constitution of the organism with definite conditions of existence.—From auth. summ. by G. Krotkov.

3712. SIEGLER, HILBERT R. (Texas Game, Fish, and Oyster Commiss., Austin.) A water plant census technique. *Jour. Wildlife Management* 5(4): 423-426. 5 fig. 1941.—Linear and transect counts made by pacing the shore line and the width of plant communities are used to establish the ratios of abundance of water plants in small lakes and marshes. Four major differences in plant communities are recognized and illustrated. Each type of plant formation requires a slight modification of the linear and transect counts. On lakes in which the band of vegetation around the shore line is of fairly uniform width, merely pacing along the shore line and counting "one" every time the plant species under consideration occurs opposite the foot is sufficient. On a lake with irregular growths of vegetation along the shore line, the linear (shore line) count is supplemented by transect counts through the width of the plant communities. Linear and transect counts are made on lakes and marshes in which several species of plants grow uniformly over the entire area. On marshes or lakes where the general plant growth is interspersed by patches of different spp., linear and transect counts are used, but the transects must run through the patches of mixed growth.—H. R. Siegler.

3713. YOUNG, VERNON A. (U. Idaho.) A promising new hybrid grass for certain burned-over forest lands. *Jour. Forest.* 39(11): 930-934. 4 fig. 1941.—Michels grass, a hybrid of *Mosida* winter wheat and *Elymus condensatus*, was planted on 6 recently burned-over habitats representing different degrees of exposure and vegetation near Moscow, Idaho. The seed was planted by 3 methods in both the spring and fall. Grazing and clipping studies were made over one growing season. High germination occurred in the field and the plants made an early and rapid growth in both the spring and fall. The grass has a fairly strong, fibrous root system, can withstand drought and is highly palatable. Despite minor drawbacks, it appears to be well suited for the inexpensive seeding of recent burns.—S. H. Spurr.

WILDLIFE MANAGEMENT—AQUATIC

(See also Entries 3950, 4874, 5424, 5829, 5944)

3714. AZEVEDO, PEDRO de, e B. BORGES VIEIRA. (Com. Piscicult. Nordeste, Fortaleza, Brazil.) Realizações da Comissão Técnica de Piscicultura do Nordeste. [Actividades da Comissão Técnica de Piscicultura do Nordeste.] *Arq. Inst. Biol. (São Paulo)* 11: 23-38. 6 pl. 1940.—The work of this federal bureau of the Brazilian Govt. comprises limnological studies, biology of fresh-water fishes and their acclimation, natural and artificial breeding (including routine application of hypophysis extract to induce fertilization), and distribution of fry in artificial lakes or reservoirs. After an exptl. period of 3 yrs., 407,700 fishes have been distributed in 90 federal reservoirs and 418 privately owned reservoirs.—A. A. Bitancourt.

BIOLOGICAL ABSTRACTS

Editor-in-Chief, JOHN E. FLYNN; Assistant Editor, JEAN MACCREIGHT

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GENERAL BIOLOGY

Editors: A. H. GRAVES, *Plant*; C. A. KOFOID, *Animal*

(See also Entries 6172, 6189, 6338, 6417, 6419, 6420, 6425, 7493, 7520, 7743, 8084, 8158, 8312, 8313)

PHILOSOPHY OF BIOLOGY

6122. DINGLE, H. (*Imp. Coll. Sci., London*.) The philosophical view-point of a scientist. *Proc. Aristotelian Soc.* 39: 121-146. 1938-39.—Many of the problems of philosophy are due to the habit of thinking of time under the image of a stream which carries us along through a region consisting of the past which we have left and the future through which we are to go. We should rather look upon ourselves as situated in a stationary present, drawing into ourselves an empty future and projecting it, populated with events, as the past. This past constitutes the field of consciousness, elements of which are sense-data and feelings. Thus the distinction between subject and object is the distinction between present and past. The rational operation of the subject correlates the elements of the field of consciousness into systems, such as physical objects, electrons, light and space. The elements are given and unalterable, and are known in the sense of being possessed, but the arrangement of these elements into a rational system cannot result in final knowledge because new experiences may demand a change in the system.—*W. E. Agar*.

MICROSCOPY, TECHNIQUE

6123. BHADURI, P. N. (*King's Coll., London*.) Rapid smear methods with nucleolar stain. *Chron. Bot.* 6 (14): 319. 1941.—High quality results in a few hours for root tips or pollen mother cells, gives "clear delineation of chromosomes and satellites with sharply contrasted nucleoli." Gives schedule for method, using decolorized basic fuchsin and light green.—*L. J. Gier*.

6124. DEAN, H. L. (*Iowa State U.*) An improved schedule for staining plant tissues in Delafield's hematoxylin and safranin. *Chron. Bot.* 6 (13): 294-295. 1941.—(See *Stain Tech.* 15: 61-65). Stain in Delafield's 5 min. to 1 hr., rinse, destain, neutralize with water containing few drops 0.1% aq. lithium carbonate, rinse, pass into 50% alc. and counterstain 3 min. to overnight in rapid safranin, differentiate, dehydrate, clear and mount in Clarite. This method allows individual and independent control of each stain.—*L. J. Gier*.

6125. HAMLY, D. H. and J. H. L. WATSON. Potentialities of optical and electron microscopes. *Trans. Roy. Soc. Canada Sect. 5* 35: 61-65. 1941.—The limits of the usefulness of these 2 instruments are illustrated and discussed.—*Authors*.

6126. JUMP, J. A. (*State Teachers' Coll., Frostburg, Md.*) The preparation of slides of the salivary gland chromosomes of *Drosophila*. *Turtox News* 19(5): 81-82. 3 fig. 1941.—Since

histological manuals do not yet include directions for preparing salivary gland slides this short article outlines methods, devoid of special refinements, for the general student. Fat larvae approaching pupation are decapitated in physiol. saline with 2 prs. fine forceps, the glands located under a dissecting microscope, and stained in aceto-carnine. Glands are crushed under cover-glass and chromosomes displayed in balsam or newer mounting media.—*J. P. Givler*.

6127. LUNDGREN, ERIK H. [*The electron microscope*.] *Tek. Tid. Uppl. A-C, Kemi* 71: 20-35. 1941.—A review with photomicrographs of kaolin, cotton fibers, cellulose fibers, jute fibers, steel, aluminum, tubercle and intestinal bacteria, tobacco-smoke particles and the reaction between colloidal gold and virus protein from tobacco-mosaic virus.—*Otto Johnson* (*in Chem. Absts.*).

6128. ZWORYKIN, V. K. (*RCA Mfg. Co., Camden, N. J.*) The electron microscope. *Instruments* 13(6): 151. 3 fig. 1940.—A brief statement of the principle and biological range of application of "electron optics" is given.—*S. E. Pond*.

PHOTOGRAPHY

6129. PORTER, ELIOT. (1077 *Sheridan Rd., Hubbard Woods, Ill.*) Color photography of birds. *Jour. Biol. Photogr. Assoc.* 10(2): 55-62. 3 fig. 1941.—Technic is described for obtaining proper color rendering with Kodachrome, including the use of flash during daylight. Causes for poor photographs are cited with directions for avoiding them.—*O. W. Richards*.

6130. VARDEN, LLOYD E. (*Agfa Ansco, Binghamton, N. Y.*) Fluorography. *Jour. Biol. Photogr. Assoc.* 10 (2): 63-70. 1941.—Fluorography is optical recording on light-sensitive film of an image formed on a fluorescent screen either by a differentially absorbed beam of radiant energy (usually

x-rays) or by a stream of directed electrically charged particles. Miniature films are used to make pictures of the fluorescent screen, which are projected for examination. This saves considerable cost and storage space. Detailed data are given for determining aperture and exposure and the choice of the emulsion used.—*O. W. Richards*.

6131. WALLER, R. K., and C. BREEDIS. (*Flushing Hosp., Long Island, N. Y.*) Photomicrography in color. *Jour. Biol. Photogr. Assoc.* 10(2): 71-76. 1 col. pl. 1941.—An arc, water cell, Nos. 2A and 86C filters are used with the microscope for making photomicrographs on Kodachrome B film. Instructions are given for determining exposure with a photoelectric exposure meter and for aligning the equipment.—*O. W. Richards*.

LABORATORY APPARATUS

6132. **ANONYMOUS.** Welding glass. *Indust. Equip. News* 9(6): 6. 1941.—The glass excludes ultra-violet rays, reduces the transmission of infra-red rays to approx. 1%, and transmits a considerable amt. of visible light. It is blue, and is designed for use in aluminum and bronze welding, glass work, instrument making, and other operations where glare of Na-yellow is encountered. Manufacturer: Willson Products, Inc., 111 Thorn St., Reading, Pa.—*M. A. Raines*.

6133. **ANONYMOUS.** Testing equipment. *Indust. Equip. News* 9(6): 40. 1 fig. 1941.—A portable kit to test water for hardness, alkalinity, sulfate and sulfite content, free CO₂, dissolved O₂, phosphate, pH value, qualitative Fe. Manufacturer: W. H. and L. D. Betz, 233 W. Wyoming Ave., Philadelphia, Pa.—*M. A. Raines*.

6134. **ANONYMOUS.** Still. *Indust. Equip. News* 9(7): 8. 1 fig. 1941.—The company's 3-gallon electrically-heated water still was improved recently by addition of automatic controls to start, stop, and maintain a desired level in a storage tank. The control also applies to flushing out after each operating cycle. A thermostatic control can be specified to maintain fixed temp. of distillate. Manufacturer: F. J. Stokes Machine Co., 5956 Tabor Road, Philadelphia, Pa.—*M. A. Raines*.

6135. **ANONYMOUS.** Thermostats. *Indust. Equip. News* 9(7): 12. 2 fig. 1941.—Two new thermostats operate in conjunction with each other to control temp. of 1 medium in accordance with temp. change in a 2d medium. Manufacturer: Minneapolis-Honeywell Regulator, 2950 4th Ave., Minneapolis, Minn.—*M. A. Raines*.

6136. **ANONYMOUS.** Sound recorder. *Indust. Equip. News* 9(7): 36. 1 fig. 1941.—The recorder employs 16-mm. film on to which sound tracks are impressed through a microphone to play back through ear phones or an optional loud speaker. Each film has capacity for 40 sound tracks, positioned by operating a numbered dial. Each track runs approx. 7 mins. on slow speed for 100-ft. film. Manufacturer: Miles Reproducer Co., 810 Broadway, New York, N. Y.—*M. A. Raines*.

6137. **ANONYMOUS.** Liquid filter. *Indust. Equip. News* 9(7): 39. 1 fig. 1941.—Plate type unit, for laboratories. It is suited for use without pump to filter quantities from 1 pint to 1 gallon by application of vacuum, or air or gas pressure. It is equipped with pump operated by $\frac{1}{4}$ hp. motor, flow rate is 1-150 gph. Manufacturer: Sparkler Mfg. Co., 1208 Webster Ave., Chicago, Ill.—*M. A. Raines*.

6138. **ANONYMOUS.** Recorder. *Indust. Equip. News* 9(7): 45. 1 fig. 1941.—A new design in the company's line of strip-chart indicator-recorders, available with synchronous motor or spring wound clock drive, in stationary and portable units, to indicate and record a specified variable against time. Manufacturer: Bristol Co., Griggs and Kelsey Sts., Waterbury, Conn.—*M. A. Raines*.

6139. **ANONYMOUS.** Liquid filter. *Indust. Equip. News* 9(8): 5. 1 fig. 1941.—The apparatus is designed for water. It assembles in the water line and uses line pressure. Manufacturer: Alsop Engineering Co., 30 Wright St., Milldale, Conn.—*M. A. Raines*.

6140. **ANONYMOUS.** Testing equipment. *Indust. Equip. News* 9(8): 7. 1 fig. 1941.—Designed to amplify signals from various detecting units, this recently improved preamplifier has a gain of approx. 50,000 volts over a frequency-response range of 1 to 17,000 cycles. Manufacturer: RCA Mfg. Co., 1941, Front and Cooper Sts., Camden, N. J.—*M. A. Raines*.

6141. **ANONYMOUS.** pH meter. *Indust. Equip. News* 9(8): 25. 1 fig. 1941.—The meter employs a mounted glass electrode with required accessories. The electrodes, both glass and reference, are factory-filled and sealed, and the glass unit is shielded against electrical effects. Turning 3 knobs on the top panel of the meter sets it for correct electrical zero of its amplifier, for asymmetry, and for sample temp. Reading then is taken on a deflection scale to show the pH in a sample of liquid held in a 50-ml. beaker. Two separate scales are calibrated 0 to 8 pH and 6 to 14 pH. The readings are accurate to 85° F. in atmospheres of 95% relative humidity. The instrument is direct reading from 0-50° C.; limit of error of adjustment is plus or minus 0.1 pH. Manufacturer: Leeds and Northrup Co., 4934 Stenton Ave., Philadelphia, Pa.—*M. A. Raines*.

6142. **ANONYMOUS.** Thermostat. *Indust. Equip. News* 9(8): 36. 1 fig. 1941.—Immersion design, in 3 ranges, from -50° to 1,100° F. It is set by coarse and fine dials on the front face of the housing. Current rating of contacts, 2,150 watts of non-inductive load at 650-volt ac. Manufacturer: D and M Mfg. Co., 53 Lincoln Ave., Midland Park, N. J.—*M. A. Raines*.

6143. **ANONYMOUS.** Testing equipment. *Indust. Equip. News* 9(8): 37. 1 fig. 1941.—A harmonic wave analyzer comprising a frequency-selective volt-meter of the heterodyne type. Representative applications are to measure distortion of recorded sound where a small amt. of frequency modulation exists, and to integrate the noise spectrum for acoustic measurements. Manufacturer: Hewlett-Packard Co., 483 Page Mill Rd., Palo Alto, Calif.—*M. A. Raines*.

6144. **ANONYMOUS.** Testing equipment. *Indust. Equip. News* 9(8): 51. 1 fig. 1941.—Measures moisture content of wood, 8-24%, by measurement of electrical resistance. Manufacturer: Wm. J. Delmhorst, 63 Charles St., Jersey City, N. J.—*M. A. Raines*.

6145. **ANONYMOUS.** Rectifier. *Indust. Equip. News* 9(8): 64. 1 fig. 1941.—The rectifier is designed to supply dc. from an ac. source. It employs vacuum tubes, for full-wave rectification. Assemblies available with output capacity to 15 amperes. Manufacturer: Highland Stamping and Mfg. Co., 1730 Berkeley St., Santa Monica, Calif.—*M. A. Raines*.

6146. **ANONYMOUS.** Thickness gage. *Indust. Equip. News* 9(8): 82. 1 fig. 1941.—An electronic thickness gage, for measuring thickness of soft and compressible materials such as rubber tissue, textiles, flexible sheet. Manufacturer: Instrument Specialties Co., 373 Main St., Little Falls, N. J.—*M. A. Raines*.

6147. **ANONYMOUS.** Liquid level control. *Indust. Equip. News* 9(8): 84. 1 fig. 1941.—The apparatus is electronic; with auxiliary emergency tube circuit. Manufacturer: Lumenite Electric Co., 405 S. Dearborn St., Chicago, Ill.—*M. A. Raines*.

6148. **ANONYMOUS.** Air conditioner. *Indust. Equip. News* 9(9): 38. 1 fig. 1941.—Cabinets, made in 11 sizes. Temp. range is from that of the room in which the cabinet is situated to 150° F; humidity ranges from room conditions to 96%. Manufacturer: Anetsberger Bros., 3322 Elston Ave., Chicago, Ill.—*M. A. Raines*.

6149. **ANONYMOUS.** Testing equipment. *Indust. Equip. News* 9(10): 19. 1 fig. 1941.—Designed for application to samples of fabric that have been treated or coated, to determine their ability to hold gas such as helium, H₂, CO₂. Provides a permeation-rate reading in terms of liters per sq. m. per 24 hrs. Permeation of a gas through the test-piece of fabric is detected by the change in the electrical conductivity of the air in a chamber of which the test-piece forms one wall. Manufacturer: Cambridge Instrument Co., 3732 Grand Central Terminal, New York, N. Y.—*M. A. Raines*.

6150. **ANONYMOUS.** Glass tubes. *Indust. Equip. News* 9(10): 29. 1 fig. 1941.—Round, conical, square, and round inside-threaded units make up a new line of precision-bore glass tubes suitable for use as cylinders in syringes, pumps; as capillaries for viscosimeters; for application in manometers, barometers, colorimeters, flow-meters. The tubes are made of Pyrex or Kimble NC glass. Normal tolerance is ± 0.0004 in. on the inside diam. No attempt is made at high accuracy on the outside. Minimum inside diam. is 0.0128 in. and max. inside is 4 inches. Manufacturer: Fish-Schurman Corp., 248 E. 43d St., New York, N. Y.—*M. A. Raines*.

6151. **ANONYMOUS.** Centrifuge. *Indust. Equip. News* 9(10): 38. 1 fig. 1941.—Four or 6 tubes are held at a fixed angle in the motor-driven head of this new laboratory centrifuge. Manufacturer: Precision Scientific Co., 1748 N. Springfield St., Chicago, Ill.—*M. A. Raines*.

6152. **ANONYMOUS.** Electric meter. *Indust. Equip. News* 9(11): 16. 1 fig. 1941.—A portable unit with a handle-equipped housing that measures $9\frac{1}{2} \times 11 \times 6\frac{1}{2}$ inches. There are 6 voltage ranges between 0 to 1 and 0 to 1,000 volts, 4 current ranges between 0 to 1 and 0 to 100 amperes, 3 ranges between 0 to 100 and 0 to 5,000 watts, and 2 resistance ranges of 0 to 300 and 0 to 3,000 ohms. Manufacturer: Superior Instruments Co., 134 Liberty St., New York, N. Y.—*M. A. Raines*.

NATURE STUDY

6153. MÉLANCON, CLAUDE. *Charmants voisins*. 281p. 66 fig. Librairie Granger Frères, Limitée: Montreal, 1940. Pr. \$1.—Essays on some 70 spp. of birds, selected because they can be seen without searching, and make their homes in surroundings frequented by men. These essays are interesting and accurate, the author having consulted freely the great standard works of American ornithology. English-speaking ornithologists will find this book a useful source book for both popular and formal French names for birds, and a number of Quebec sayings and beliefs about birds. The illustrations, by JACQUES BÉDARD, are a splendid supplement to the text.—*From review in Canadian Field-Nat.*

6154. SHARP, A. J. (*Tennessee U.*) *The Great Smoky Mountains National Park, an important botanical area.* *Chron. Bot.* 6(13): 296-297. 1941.—Brief description of the area and flora with mention of ecological and taxonomic works completed (vascular plants, popular flora, bryophytes, fungi).—*L. J. Gier.*

INSTITUTIONS, ADMINISTRATIONS

6155. COMPTON, R. H. (*Kirstenbosch, S. Africa.*) *On the history of the National Botanic Gardens of South Africa.* *Chron. Bot.* 6(13): 297. 1941.

6156. PACKARD, C. (*Marine Biol. Lab., Woods Hole, Mass.*) *American biological stations. I. Marine biological laboratory.* *Turtor News* 18(7): 93-94. 2 fig. 1940.—This is the first of a series of short, informative articles on the principal biol. stations of America. This one tells of teaching and investigation at the Marine Biol. Laboratory during the past 50 yrs. The influence of the founders, collecting opportunities with a widely-diversified biota at Woods Hole, the revered old and the efficiently-planned new buildings are briefly referred to along with comments on investigative and educational opportunities and recreational features. Descriptions of other stations are to follow.—*J. P. Givler.*

MUSEUMS, BOTANICAL AND ZOOLOGICAL GARDENS, AQUARIA, ETC.

6157. BLAUFUSS, A. H. (*Gen. Biol. Sup. House, Chicago, Ill.*) *The preservation of marine specimens.* *Turtor News* 18(8): 101-103. 1 fig. 1940.—Museum specimens of marine animals may be prep'd. by following special techniques of preservation, previous anaesthetization often being necessary. This article, the first of a series, deals with methods for Protozoa and Porifera. Protozoa, very abundant in the sea, may be taken with fine towing nets and preserved at once in 10% sea-water formalin. Special methods for Radiolaria and Foraminifera are outlined. Sponges are preserved in 70% alc. and large ones should be cut in pieces.—*J. P. Givler.*

6158. COCKERELL, T. D. A. (*U. Chicago.*) *The Zoological Museum at Tring.* *Science* 94(2442): 364-365. 1941.—A discussion.—*E. J. Umberger.*

ETHNOBIOLOGY

(See also Entries History of plant sciences, 6172; Nicotiana rustica in New Mexico, 7831)

6159. AMES, O. *Economic annuals and human cultures.* vii+153p. 2 pl., 46 fig. Harvard University Botanical Museum: Cambridge, 1939.—This monograph takes up the significance of the angiosperm seed, antiquity of economic annuals, economic plants through the Pleistocene, the more important economic annuals, and plants as measures of cultural time.—*Courtesy Exp. Sta. Rec.*

6160. BELL, WILLIS H., and EDWARD F. CASTETTER. (*U. New Mexico.*) *Ethnobiological studies in the American Southwest. VII. The utilization of yucca, sotol, and bear-grass by the aborigines in the American Southwest.* *Univ. New Mexico Bull. Biol. Ser.* 5(5): 3-74. 1941.—Material for this study was secured by field studies among the several Indian tribes of the Southwest as well as gleanings from the relevant historical and archaeological literature. In the introduction, the qualities of the fibers of several species of *Yucca* are discussed from the standpoint of their utilization commercially. Data on the geogr. distribution of the species of *Yucca*, sotol (*Dasylinion*) and beargrass (*Nolina*) in the Southwest are presented. The utilization of the fruits, and

in some cases crowns, flower stalks and flowers, of *Yucca* as food by the various Indian tribes is discussed in detail, covering *Y. torreyi*, *Y. elata*, *Y. thompsoniana*, *Y. brevifolia*, *Y. baccata*, *Y. glauca*, *Y. angustissima* and *Y. schidigera*. Of these, *Y. baccata* was by far the most important, being used by most of the tribes of the Southwest. Considering the genus as a whole, the fleshy-fruited or baccate spp. were much more extensively utilized than were the dry, capsular-fruited ones. Despite the fact that *Yucca* was gathered widely for food, the leaf, or fiber extracted from it, was the most important product secured from the plant. The use of the leaves of species of *Yucca* for making sandals is discussed in detail with considerable emphasis on the archaeological aspects. This is followed by a presentation of the utilization of *Yucca* leaves in basketry, in matting and in cradles; as a source of fiber for cordage and for use in feather and fur cloth, fabrics, netting, headrings and brushes; finally, miscellaneous uses. The well-known employment of the roots of several species of the genus as a detergent is presented in detail. Although *Yucca* was utilized far more extensively for the above purposes than either *Dasylinion* or *Nolina*, these 2 genera also were employed for similar purposes in the Southwest. Thus the pit-baked crowns of sotol (*D. texanum* and *D. wheeleri*) constituted an important source of food, particularly for the prehistoric dwellers of western Texas and southeastern New Mexico and some of those in south-central Arizona. The method of prep'n. is described. The uses of sotol, and/or beargrass in making sandals, hammocks, hearths and fire-drills, basketry, mats, thatching, storage containers, receptacles for washing grain, and for fiber, are discussed.—*E. F. Castetter.*

6161. ORR, PHIL C. (*Santa Barbara Mus. Nat. Hist.*) *Exceptional burial in California.* *Science* 94(2449): 539-540. 1941.—A unique burial uncovered on Mescalito Island, an old Indian site near Santa Barbara, Calif., is described. The skeleton of a small adult, age 30-35, lay in the conventional face-down flexed position of the Canaslifo but upon the highly inlaid scapula of a whale.—*E. J. Umberger.*

6162. SCHIEMANN, E. *Bestimmung einiger Pflanzenfunde aus dem Grabe des Tut-Ench-Amon.* *Bot. Jahrb.* 71 (4): 511-519. 1941.

TEXTS AND EDUCATION

6163. GIVLER, J. P. (*Woman's Coll., U. N. Carolina.*) *Test-tube aquarium and nine-power lens.* *Turtor News* 19 (1): 1-4. 1 fig. 1941.—Test-tubes $1\frac{1}{2} \times 7$ in., used as small balanced aquaria, were found excellent both as collecting receptacles and also for handling living material in the laboratory. The corks are pierced with a $\frac{1}{4}$ " "breather" hole to permit gaseous exchanges. Examination of contents of these living microcosms with a $9 \times$ triplet magnifier reveals an unbelievable amount of detail and bridges the gap, for young naturalists, between naked-eye study and the compound microscope.—*J. P. Givler.*

6164. POWERS, SAMUEL RALPH, ELSIE FLINT MEUNER, HERBERT BASCOM BRUNER, and JOHN HODGDON BRADLEY. *Our world and science.* vii+654p. Illus. Ginn and Co.: Boston, 1941. Pr. \$1.76.—A general science text for use in a 1-yr. course in the 9th year of school. The plan upon which the authors proceed is to capitalize upon the natural interests of pupils and to avoid unnecessary technical terminology. Every effort is made to relate the concepts presented to the familiar world of the students. The book is arranged in 9 major sections: 1—What is Science?, 2—The World of Sky, 3—The World of Water, 4—The World of Air, 5—The World of Living Creatures, 6—The World of Rock, 7—The World of Action, 8—The Preservation of Health, and 9—The Conservation of Wealth. Throughout the text there occur exptl. exercises and to each chapter there are appended appropriate statements for correction, questions for discussion, and projects.—*J. M. Herring.*

6165. UNDERHILL, ORRA E. *The origins and development of elementary-school science.* xii+347p. Frontispiece. Scott, Foresman and Co.: Chicago, 1941. Pr. \$2.50.—A much needed and very usable book in the field of elementary school science. It traces the beginnings of science as taught to children, beginning about 1750 through to the present

time. Science in relation to the moral, emotional, aesthetic, disciplinary and utilitarian values of life throughout the decades is particularly stressed. The gradual emergence from the authoritarian, romanticism and nature study movements are traced to the present emphasis on accurate observation, experimentation and demonstration. The author also gives considerable evidence for the great need for an integrated science program through all the elementary grades, as well as in the junior and senior high schools.—J. C. Johnson.

6166. WEYMOUTH, CLINTON G. (*Greenfield High Sch., Greenfield, Mass.*) Science of living things. viii + 534p. Col. frontispiece, illus. Henry Holt and Co.: New York, 1941.—This is a fine text, full of carefully selected facts and principles of basic importance not only to students but to adults. Although apparently designed primarily as a general survey course in the biol. sciences for college students it is well adapted for general reading.—J. C. Johnson.

MISCELLANEOUS

6167. KIRK, L. E. (*U. Saskatchewan.*) The agricultural scientist and the war. *Jour. Amer. Soc. Agron.* 33(12): 1049-1056. 1941.

6168. LOCHHEAD, J. H. (*Johns Hopkins U.*) Artemia, the "brine shrimp." *Turtox News* 19(2): 41-45, 1 fig. 1941.—A compact summary reviewing many papers plus the

author's own observations. This almost legendary creature, cosmopolitan in distribution, is about $\frac{1}{2}$ in. long. Stated to be the most primitive living crustacean, it has "phylopodous" trunk and primitive nauplius larva: development gradual without complex metamorphosis. The animal shows great tolerance of change in salinity of water, cells of gut wall probably exerting regulatory control. "Back swimming" is due to phototropic response to light from above. Reproductive behavior is interesting. During copulation the ♀ permits insemination only after she has recently completed a molt. The species problem is difficult and apparently needs further work although a single sp., *A. salina*, with various physiological races, was formerly recognized.—J. P. Givler.

6169. PETERSON, ROGER T. Symbols of nature in art. *Audubon Mag.* 43(5): 403-412. 4 pl. 1941.—Man's interest in birds may stem from their apparent freedom. From the Cro-Magnons, Chinese, and Egyptians down to modern man, natural forms are used as symbols in art. Bestiaries were an important part of mediaeval religion. The symbolism of the dragon, phoenix, quetzalcoatl, magpie, mandarin duck, owl, swallow, pelican, eagle, quetzal, fox, and others is discussed briefly.—J. A. Gray, Jr.

6170. TIPPO, OSWALD. (*U. Illinois.*) An analysis of the major interests of the members of the Botanical Society of America. *Science* 94(2440): 326-327. 1941.

BIOGRAPHY AND HISTORY

CARROLL W. DODGE, *Editor*

(See also Entries 6189, 7162, 7528, 7637, 7984, 8160)

HISTORY

6170A. BANCKES, RICHARD. An herbal (first published in 1525). [Republished in facsimile, with a modern transcription by SANFORD V. LARKEY and THOMAS PYLES.] vii-xxiv + 86 + [72]p. New York Botanical Garden: New York, 1941.—Approx. 200 plants are mentioned, their virtues given, their various names, and a certain amt. of botanical information. All names are indexed. Only 2 original copies of the book are known in the world today—one in the British Museum (from which the facsimile has been taken) and one in the Huntington Library in California. The editors' introduction gives a review of the possible sources and the successors of the original.—Courtesy *New York Botanical Garden*.

6171. FLEXNER, SIMON, and JAMES THOMAS FLEXNER. William Henry Welch and the heroic age of American medicine. x + 539p. 16 pl. Viking Press: New York, 1941. Pr. \$3.75.—The title accurately characterizes the period covered in this life. In it medicine advanced from an art to a science and the outstanding leader in this transformation is the subject of this biography. Four major changes took place in medical education in this period: the establishment of laboratory method, the introduction of full-time professorships for the major chairs of instruction in medical colleges, the raising of standards of instruction in medical colleges, and the rise of public health and preventive medicine; in each of these changes, Dr. Welch played a leading part.—C. A. Kofoid.

6172. REED, HOWARD S. (*U. California.*) A new series of plant science books. Vol. 7. A short history of the plant sciences. 323p. 37 fig. Chronica Botanica Co.: Waltham, 1942. Pr. \$5.—This is a general and yet a comprehensive summary of the history of the plant sciences from the time of the earliest records of ancient Assyria, Egypt, and China in the Old World, with even a summary of pre-Columbian American contributions, thus covering the period from prehistoric times to date. It is broadly organized under the general subjects of accumulation of information, verification, classification, and interpretation. The 20 chapters are replete with information covering an enormous range of subject matter from the opening one on the gardeners and herbalists of antiquity to the closing one on significant names in the history of botany, classified as discoverers, describers and classifiers, specialists, and exponents; and between these chapters numerous more modern aspects of the subject such as cytology, water economy of plants, the fixation of C, the assimilation and fixation of N, plant

nutrition, metabolism, mycology, and plant pathology are considered in detail; nor are the older subjects such as the development of systems of classification, plant geography and morphology overlooked. To each chapter is appended a pertinent bibliography of source publications, and throughout the work the contributions of leading investigators who have made important discoveries or whose work has been of real significance in the development of our knowledge of the plant sciences in their broader aspects are summarized and evaluated. The chapter on the nascent period beginning with the work of the Greek philosophers and scientists, followed by that on the retrogressive period extending from Roman domination to the beginning of the 12th century, and the one on the renascent period extending from 1200 to 1600, with a chapter on the 17th and another on the 18th century, provides a well-rounded summary and interpretation of the developments covering a period of approx. 2300 yrs. As the author truly states, the beginner is often bewildered by the vast number of names of workers in his field, but here within the covers of a single volume of modest size he will find a fund of authoritative information, well organized, attractively presented, well balanced and evaluated, which will give him a most comprehensive picture of the history and gradual development of our present knowledge of plant science in all countries and from remote antiquity to the immediate present. Using the term botanist in its very widest sense, all, no matter what their field, will profit through a study of this reference work, and incidentally workers in other fields than the plant sciences will likewise profit by its perusal. Its publication is a landmark in the history not only of the plant sciences, but of science as a whole.—E. D. Merrill.

6173. SCHIERBEEK, A. Leeuwenhoek en zijn globulenteorie. [Leeuwenhoek and his globular theory.] *Natuurwetenschap. Tijdschr.* 21(7): 185-189. 1940.—Leeuwenhoek suggested in his globular theory a sort of molecular theory of the ultimate structural elements that could be observed with his microscope. He discusses his views in some letters written between 1674 and 1685. He opposes the idea of Descartes that water is composed of small snake-like particles but supposes that it is composed of small globules of the size of 1/1,000,000,000 of a sand particle. He discusses from this standpoint the composition of cells of the muscles. He concludes with the words of Aristotle that more attention should be given to observations than to theories.—J. C. Th. Uphof.

BIOGRAPHY

6174. GRIGORAKI, L. (*Lab. de Parasit., Marseille.*) Le Docteur Sabouraud (1864-1938). *Mycopathologia* 2(3): 171-200. 1940.—A brief biographical account of Sabouraud and his monumental work on the Dermatophytes. Appended is a complete bibliography of Sabouraud's work.—E. E. Baker.

6175. HOYT, AVERY S., STANLEY B. FRACKER, and MABEL COLCORD. (*U. S. Bur. Ent.*) Lee Abram Strong. *Proc. Ent. Soc. Washington* 43(7): 156-166. Portrait. 1941.

6176. KINCAID, TREVOR. (*U. Washington.*) John Earl Guberlet (1887-1940). *Murrelet* 22(1): 3-4. Portrait. 1941.—A short biography of Dr. Guberlet, parasitologist, marine biologist, and professor at the U. of Wash.—J. W. Slipp.

6177. LIBERMAN, L. A., and M. V. STADNICHENKO. Life of D. K. Zabolotny. *Mikrobiol. Zhurnal [Kiev]* 7(1/2): 5-38. 1940.—Biographical sketch of a former president of the

Ukrainian Acad. of Sci. and the founder of the Inst. of Microbiology and Epidemiology of the Academy.—Isyodore Hlynka.

6178. REDAELLI, P. (*U. Pavia.*) and V. VISOCCHI (*U. Firenze.*) Agostino Bassi, precursor of comparative mycopathology. *Mycopathologia* 2(1): 37-42. 1939.—A brief account of the investigations of Agostino Bassi (1773-1856) on calcino or silkworm rot caused by *Botrytis bassiana* Crivelli. Appended is a list of Bassi's publications and publications concerning Bassi.—E. E. Baker.

6179. REISS, P. Notice nécrologique sur le Professeur d'Arsonval. *Arch. Phys. Biol. et Chim. Phys. Corps Organ* 15(49): 1-3. 1940-41.

6180. STEVENSON, JOHN A. (*Bur. Pl. Indust., Washington, D. C.*) Louis Charles Christopher Krieger, 1873-1940. *Mycologia* 33(3): 241-247. Portrait. 1940.—American mycologist and botanical artist.—J. A. Stevenson.

BIBLIOGRAPHY

EILEEN R. CUNNINGHAM, *Editor*

(See also B. A. 16(2): Entries 3644, 4574; and in this issue 6170A, 7979, 8612A)

6181. BOLETIN de ENTOMOLOGIA VENEZOLANA (Caracas). Volume 1, Number 1, October, 1941. Director: PABLO J. ANDUZE. Editorial committee: RENE LICHY, H. VOGELSANG, CHARLES H. BALLOU, y FELIX PIFANO. 24 pages, 2 articles.—This issue contains an editorial, a list of collaborators and the following 2 articles: A new species of tick, *Ornithodores anduzei* (Ixodoidea, Argasidae), by R. MATHESON, and Lista Provisional de los zancudos Hematofagos de Venezuela (Dipt. Culicidae) by PABLO J. ANDUZE.

6182. DOYLE, MABEL HUNT. Index to technical bulletins [of the U. S. Dept. of Agriculture] Nos. 501-750. 169p. United States Government Printing Office: Washington, 1941.

6183. KLEINSCHMIDT, H. E. Motion pictures on tuberculosis. *Amer. Rev. Tuber.* 44(6): 768-771. 1941.—A list of films obtainable from the office of the National Tuberculosis Assoc.

6184. MERRILL, M. C. (*U. S. Dept. Agric.*) The publications of the United States Department of Agriculture and the policies covering their distribution. 23p. American Library Association: Boston, 1941.

6185. REVUE CANADIENNE de BIOLOGIE. Volume 1, Number 1, January, 1942. General Secretary: M. LAUGIER. Editorial Secretaries: L. P. DUGAL and E. ROBILLARD. Executive Committee: L. CASAUBON (general treasurer), J. LABARRE, H. LAUGIER, G. PREFONTAINE, J. ROUSSEAU, and L.-C. SIMARD. Bi-monthly. 112 pages, 6 articles in first issue. Published by the Univ. of Montreal, Montreal, Canada. Subscription price \$6.—Revue Canadienne de Biologie is to consist of a minimum of 500p. of text per year and is to be issued about every 2 months. The following papers compose the first issue: Le complexe neuro-insulaire du pancréas chez les mammifères adultes by L.-C. SIMARD; Lethal limits of temperature for young goldfish by F. E. J. FRY, J. R. BRETT, and G. H.

CLAWSON; The sex hormone actions of some steroids related to desoxycorticosterone and progesterone by GEORGES MASSON, ADRIEN BORDUAS, and HANS SELYE; The mechanism of the synergistic action of pilocarpine and adrenaline on salivary secretion by GEORGE W. STAVRAKY; Les protides des semences de la fève Gourgane (*Vicia faba*) by JULES LABARRE and LUCIEN DELCOURT; and Un nouveau liquide physiologique by J. L. TREMBLAY and G. W. CORRAULT.

6185A. VARIOUS AUTHORS. Lista de trabajos del Instituto de Fisiología. *Lista Trab. Inst. Fisiol. Fac. Cienc. Med. Buenos Aires* 1919-1939. 1-210. 1941.—A list of 1001 titles, with indexes to authors' names and to subject-matter. Appended is a list of 36 publications completed by members of the Institute while residing abroad; also a list of periodicals (with the abbreviations employed).

6186. ANONYMOUS. Bio-bibliografia del Prof. M. Acosta Solis. Naturalista-geobotanico. Director del Instituto Ecuatoriano de Ciencias Naturales. 27p. El Instituto Ecuatoriano de Ciencias Naturales: Ecuador, 1940.

6187. ANONYMOUS. Suplemento ao guia das bibliotecas Brasileiras, Novembro-Dezembro 1940, Janeiro a Junho 1941. *Min. Educacao Saude Inst. Nacion. Livro Col.* 18p. 1941.

6188. ANONYMOUS. Guia das bibliotecas Brasileiras. [Guide to the libraries of Brazil.] *Min. Educacao Saude Inst. Nacion. Livro Col.* B2. 1-245. Map, 1941.—A directory of 778 libraries, giving size, scope, date of establishment, fields of knowledge covered, direction, character of the cataloguing, and name and address of librarian.

6189. ANONYMOUS. Selected references on current research in plant taxonomy, ecology, and geography in Europe, Africa, Asia, and Australia. II. *Chron. Bot.* 6(13): 298-311. 1941.—This additional list contains addresses of about 660 botanists. Workers of the Latin American countries are to be listed in Chron. Bot. in the near future.—L. J. Gier.

EVOLUTION

ALFRED EMERSON, *Editor*

(See also B. A. 16(1) Entries—Polyploidy, 139, 154; Prime types in *Datura*, 182; Color variation, 235; Hybrids in Acriidae, 243; Evolution of society, 312, 321; Human races, 323, 1252; Isolation and personality, 353; Age and area, 395; Human evolution, 1253; Parasites and taxonomy, 2257; Homology, 2419; and in this issue—Viviparity in *Agrostis*, 6217; Phenylketonuria gene in man, 6248; Saltation in fungi, 7746; Cytol. basis of speciation in *Polygonatum*, 7761; Speciation of *Ranunculus* in N. America, 7788; Increase of number of C-atoms in seed fatty acids in course of evolution, 8072; Evolution of fishes, 6883, of Protozoa, 8317, of respiratory mechanisms in copepods, 8374, of American rodents, 8607; Insecta, 8489; Speciation in *Sagitta*, 8352, in chickadees of Canada, 8585, in flying squirrel, Idaho, 8608)

6190. CLOUD, PRESTON E. Jr. Homeomorphy, and a remarkable illustration. *Amer. Jour. Sci.* 239(12): 899-904. 1 pl. 1941.—Homeomorphy is briefly considered and the wider usage of the term in preference to the commonly misused word "mimicry" is urged. Some typical examples of homeomorphy are cited and the remarkable heterochronous

brachiopod homeomorphs *Tetractinella* and *Cheirotethys* are discussed and illustrated.—Auth. abst.

6191. MCNAIR, JAMES B. (*Los Angeles, Calif.*) Energy and evolution. *Phytologia* 2(2): 33-50. 1941.—The paper develops the theory that species formation occurs during periods of increased activity, that plants which do the most

difficult work have evolved to the highest positions, and that as morphological structures evolve from simple to complex so plant chemical compounds evolve from simple to complex. Chemically each species is in a state of mobile equilibrium between reversible reactions. The existence and permanency of a species depend upon the existence of constant external and internal conditions and show a fixed ability to synthesize characteristic chemical compounds. The splitting off of new spp. falls within the times of greater activity. There is a tendency to increased complexity both in morphology and chemical compounds with evolutionary progress. The stable conditions in the tropics are not as likely to produce these changes as the fluctuating conditions in the temperate zones. Detailed study of plant alkaloids, glycerides, fatty acids, and volatile oils shows that in general the plants of temperate regions and the higher evolved tropical families produce the most complex chemical compounds and perform the most difficult work. Similar studies show that trees do less difficult work than shrubs or herbs. Annual herbs have a more rapid rate of metabolism and do more difficult work than the polycarpic shrubs and trees. The length of the fruit maturation period is shorter in annual herbs than in shrubs and trees and is an indication of the more difficult work carried on by the highly evolved herbs

in apposition to that of the more primitive shrubs and trees. Among plant parts longevity is a measure of metabolism. In this regard flowers greatly exceed leaves, and leaves exceed stems. The shortest-lived flowers are produced by annual herbs and exhibit the most intense metabolism, do the most difficult work, and occupy in general the most advanced phylogenetic positions. It seems highly probable, therefore, that the position in evolution of some spermatophytes is indicated by the kinetic energy of their life cycles and the potential energy of some of their chemical compounds.—H. N. Moldenke.

6192. WHITE, LESLIE A. (U. Michigan.) The symbol: the origin and basis of human behavior. *Philosophy of Science* 7(4): 451-463. 1940.—The natural processes of organic evolution brought into existence in man, and man alone, a new and distinctive ability to use symbols. The organic basis of this faculty is unknown, but upon it all civilization depends.—L. J. Lafleur.

6193. WILLIS, J. C. The course of evolution by differentiation or divergent mutation rather than by selection. viii + 207p. 10 fig. Macmillan Co.: New York, 1940.—This is mainly a discussion of basic principles of plant evolution and adaptation in the light of modern research.—Courtesy *Exp. Sta. Rec.*

CYTOLOGY

Editors: R. E. CLELAND, *Plant*; C. E. McCLUNG, *Animal*

(See also Entries 6126, 6216, 6219, 6223, 6228, 6231, 6233, 6600, 6638, 6652, 6671, 6839, 7041, 7068, 7723, 7761, 7766, 7783, 7802, 7809, 7819, 8017, 8036, 8305, 8318, 8323)

GENERAL

6194. BULLER, A. H. R. The diploid cell and the diploidisation process in plants and animals, with special reference to the higher fungi. II. *Bot. Rev.* 7(8): 389-431. 1941.

PLANT

6195. BABU, C. N. (Agric. Res. Inst., Coimbatore, India.) Certain abnormalities in the root tip of groundnut. *Current Sci.* 10(6): 291-292. 4 fig. 1941.—Cases of chromosome fragmentation, ring chromosomes, lateral satellites, and spontaneous or induced somatic doubling are recorded.—R. A. Muttikowski.

6196. COLEMAN, L. C. (U. Toronto.) The relation of chromocenters to the differential segments in *Rhoeo discolor* Hance. *Amer. Jour. Bot.* 28(9): 742-748. 13 fig. 1941.—The ring-forming heterozygote, *R. discolor*, shows, in premeiotic resting nuclei, chromocenters in numbers approximating those of the diploid complement (12). In zygo- and pachyphase, the still recognizable chromocenters congregate to 1, 2 or 3 clumps corresponding to the single ring or to the 2 or 3 chains found at 1st metaphase. Although the association of chromocenters with the primary constriction regions of the different chromosomes could not be established, as has been done in *Veltheimia*, such a connection is practically certain from the fact that condensed regions have been found at the primary constrictions in the prophase of pollen grain mitosis corresponding to the chromocenters found in the pollen grain resting nucleus. Chromocenters effectively prevent pairing and crossing over in this region and thus provide a mechanism to preserve the balanced lethal system required to maintain ring-forming heterozygotes.—L. C. Coleman.

6197. FARDY, A. Étude de la mitose et dénombrement chromosomique chez *Atropa baetica* Willk. *Bull. Mus. Nation. Hist. Nat. [Paris]* 12(2/4): 132-136. 12 fig. 1940.—In *A. baetica* (Solanaceae) the root meristems contain nuclei characterized by the presence of "euchromocenters" destined to produce chromosomes according to the scheme described. The nucleolus does not show protuberance of nucleolar origin. The chromosome number $2n=72$ in the somatic cells suggests that this species is hexaploid, since the basal number in the Solanaceae is generally 12. The number $2n=72$ has been confirmed by a study of microsporogenesis.—H. Simons.

6198. GYÖRFFY, BARNA. (Kais, Wilhelm, Inst.) Tetraploid paprika. *Acta Univ. Szeged. Acta Biol. Pars: Bot.* 5(1/2): 30-38. 2 pl. 5 fig. 1939.—0.25-5% colchicine applied

to the growing point of wild pepper plants, *Capsicum annuum*, produced a mixed $2n$ and $4n$ growth. By pruning out the $2n$ parts, the $4n$ can grow. Chimaeral regions show large and small stomata in the same leaf, and mixed n and $2n$ pollen grains in anthers. Normal $2n$ is 24, but irregularities in meioses may disturb that number. 48 is the regular tetraploid number. It is hoped vitamin C content will be increased by tetraploidy. A German summary is included.—Mary Gojács.

6199. JONES, DONALD F. (Connecticut Agric. Exp. Sta.) Natural and induced changes in chromosome structure in maize endosperm. *Proc. Nation. Acad. Sci. U. S. A.* 27(9): 431-435. 1941.—In maize endosperm, spontaneous changes are easily seen when dominant gene markers are present in single dose. They are as frequent as 20 per hundred seeds in untreated material and 357 per hundred in x-rayed inflorescences. Such changes result mostly from the removal of whole or parts of chromosomes during meiosis.—R. A. Muttikowski.

6200. KARASAWA, K. Karyological studies in *Crocus* II. *Jap. Jour. Bot.* 11(1): 129-140. 73 fig. 1940.—Somatic chromosome numbers of 8 spp. of *Crocus* studied are: *C. hyemalis*, 6 and 2 fragments; *C. vernus albus*, 8; *C. stellaris pallidus*, 8; *C. stellaris*, 10; *C. speciosus* (3 garden vars.), 12, 14, and 16; *C. sativus*, 16 and 40; *C. fletscheri*, 20; *C. korolkowii*, 20; *C. salzmannii*, and also its var., *erectophyllus*. 24. Special reference is made to abnormal behavior of meiotic chromosomes.—P. D. Strausbaugh.

6201. MIÈGE, J. (Fac. Sci., Alger.) Contribution à l'étude des Phalaridés. *Bull. Soc. Hist. Nat. Afrique du Nord* 30(4): 223-245. 2 pl., 9 fig. 1939.—Beside a study of the geogr. distribution of Phalarideae in N. Africa, the chromosome number of somatic cells of many spp. of this tribe was studied. For 3 spp. which had not been studied before, the diploid number was found to be: 12 + one pair of satellites for *Phalaris brachystachys*, 28 for *P. tuberosa* and 28 for *P. coerulescens*.—J. L. Tremblay.

6202. RUTLAND, J. P. The Merton catalogue. A list of chromosome numbers of British plants. 1. *New Phytol.* 40(3): 210-214. 19 fig. 1941.

6203. SRINATH, K. V. (Intermediate Coll., Bangalore, India.) The structure of the chromosome. *Current Sci.* 10(7): 333. 1 fig. 1941.—In root smears of somatic chromosomes of *Muscari*, cases were found where the satellite of one of the anaphase chromosomes was split, thus strengthening the assumption that the somatic anaphase chromosome is bipartite.—R. A. Muttikowski.

ANIMAL

6204. COOPER, KENNETH W. (Princeton U.) Visibility of the primary spindle fibers and the courses of mitosis in the living blastomeres of the mite, *Pediculopsis graminum* (Reut.). *Proc. Nation. Acad. Sci. [U. S. A.]* 27(10): 480-484. 4 fig. 1941.—Spindle fibers become visible in the pro-metaphase and persist to the telophase, and appear as continuous streaks or striae, or perhaps delicate lamellae, from pole to pole. They are dull gray and appear to pass, but not run to, the curious refringent materials located at the equatorial plate. Hence in at least this mite there exists visible evidence of the morphological reality of the spindle fibers.—R. A. Muttikowski.

6205. FRUGONI, PIERO. (Mayo Found., Rochester, Minn.) Cytologic studies on hypophyseal adenomas. *Trans. Amer. Microsc. Soc.* 60(2): 261-272. 3 fig. 1941.—The areas of the nuclei and of the nucleoli were studied in 18 surgical specimens of simple pituitary adenomas, in 13 surgical specimens of active pituitary adenomas and in 16 normal pituitary glands. The av. area of the nuclei and of the nucleoli was much more variable in the active adenomas greater in the active adenomas than in the normal glands. The nucleonucleolar ratio, about equal in the normal glands and in the simple adenomas, was conspicuously lowered in the active adenomas. The size of the nuclei and of the nucleoli was much more variable, in the active adenomas than the other 2 groups. These data support the hypothesis that the size of the nucleus and, to a greater extent, of the nucleolus is connected with the cellular activity.—Piero Frugoni.

6206. GAVAUDAN, PIERRE. Action du 1, 2, 4, 5 tétraméthylbenzène sur la carcinogenèse, la cytodierèse et la croissances végétales. *Compt. Rend. Trav. Fac. Sci. Marseille* 1(2/3): 40-42. 1941.—Durene (1,2,4,5 tetramethylbenzene) is of interest in the study of mito-inhibition because of its structural simplicity (one benzene ring only). The cytologic abnormalities it induces resemble those caused by acenaphthene. After some hrs. of action rotation of the axis in the metaphase is observed. Anaphase and telophase are perturbed, the spindle being altered, since the chromosomes do not separate normally. Dividing polyploid nuclei are frequently seen, and the "cloisonnement" deviates greatly as to its form and orientation.—H. Simons.

6207. HARVEY, ETHEL B. (Princeton U.) The cytology of fertilization and cleavage of *Arbacia punctulata*. *Turtoz News* 19(7): 97-99. 18 fig. 1941.—Most of the eggs of this sea urchin are ready for fertilization when laid. The small eccentrically placed nucleus, deeply-staining sperm head and asters appear well in 7 μ sections of the eggs fixed in Bouin's fluid and stained in Heidenhain's iron haematoxylin. The narrative tersely describes the details of syngamy and cleavage up to the early blastula stage, giving elapsed time since fertilization and describing the 18 unretouched photomicrographs which illustrate the article.—J. P. Givler.

6208. HENSHAW, PAUL S. (Nation. Inst. Health.) The induction of multipolar cell division with x-rays and its possible significance. *Radiology* 36(6): 717-724. 6 fig. 1941.—Sperm and eggs of the sea urchin, *Arbacia punctulata*, placed in sea water showed fertilization and development of the ova, division occurring in about an hour. If either gamete were irradiated before fertilization cleavage gave rise to several instead of 2 blastomeres. Doses of irradiation up to 50,000 r destroyed neither the sperm motility nor its ability to fertilize. Multipolar cleavage occurred if either gamete was irradiated. The initial evidence of multipolarity occurred in the late prophase. It is probable that multipolar mitosis with uneven distribution of chromatin to daughter cells is one means by which X-rays cause cell death. This, constituting a somatic mutation, might conceivably represent the basis for malignant growth succeeding irradiation. Such a thesis would require the origin of malignant neoplasm from a single cell, a belief which is not supported by available evidence. It is reasonable to assume, however, that radiation particles impinging upon several cells in a treated area might effect similar changes in more than one, each thereby developing malignant propensities simultaneously by somatic mutation. It would not be necessary for the carcinogenic agent to act more than once, moreover, since the molecular changes produced in the chromatin would be self perpetuating.—E. A. Gall.

6209. ISISAWA, MASAO, und REITARO MAKINO. Über das Zytzentrum der glatten Muskelfasern vom Menschen. [With Ger. summ.] *Hukuoka Acta Med. (Hukuoka-Igaku-Zasshi)* 34(5): 489-491. 1941.—A centrosome of smooth muscle in man is a diplosome near the nucleus, one in each muscle cell.—P. M. Suski.

6210. KOMAI, T., and T. TAKAKU. (Kyoto Imp. U.) Two independent inversions in the X-chromosome of *Drosophila virilis* and their effects on crossing over and disjunction. *Cytologia* 11(2): 245-260. 1940.—A strain of *D. virilis* having two inversions in the X-chromosome, In(X)Spd, was obtained by X-radiation. From this 2 other strains, In(X)Sp and In(X)Sd, were obtained through crossing over in the intercalary region. In all strains crossing over in the regions included in inversions is greatly suppressed, as it is in the intercalary section in In(X)Spd. Crossing over in the section proximal to In(X)Sd is somewhat suppressed, while it is not suppressed in the uninvolved distal sections in all these strains. Primary non-disjunction is 13-14 times as frequent in In(X)Spd (het.) as in the normal strain, with the sex ratio among the exceptions being 1 ♀:5.4 ♂♂. In(X)Sd throws nearly half as many primary exceptions as In(X)Spd; In(X)Sp behaves normally. Secondary non-disjunctions are 10 times normal in In(X)Spd, the sex ratio of exceptions being 1 ♀:1.24 ♂♂. The progeny of XXY ♀♀ included some XXX ♀♀ and some XO ♂♂. The inversion breakage points appear to behave like the centromere in cross-over suppression since the chromosomes remain asynapsed near these points. Suppression of crossing over is correlated with primary non-disjunction and is even more important to secondary non-disjunction. The comparative scarcity and disturbed sex ratios of secondary exceptions in *D. virilis* may be correlated with the more intimate regional affinity of the X-chromosomes here than in *D. melanogaster*.—K. C. Atwood.

6211. NIIYAMA, H. (Hokkaido Imp. U., Sapporo.) The X-0 type of sex chromosome found in *Ovalipes punctatus* (de Haan) (Crustacea: Decapoda). *Jap. Jour. Genetics* 17(2): 41-45. 13 fig. 1941.—In the ♂, 2n=103, the X-chromosome being without a synaptic mate.—James Neel.

6212. SESHACHAR, B. R. (Central Coll., Bangalore, India.) Chromosome number and polyploidy in Amphibia. *Current Sci.* 10(6): 282-284. 1941.—A collective review of the chromosome numbers in various families, genera and species of Amphibia. Anura are fairly stable; the Urodela show variation from 9-32 chromosomes. Polyploidy is occasional and has been induced experimentally. Polyploid animals are abnormal and die early.—R. A. Muttikowski.

6213. TARAQ, S. (Hokkaido Imp. U.) Microchemical studies on the Golgi apparatus using protease-Nile blue sulphate technique. II. Golgi apparatus of pancreatic acinar cells in the mouse in fixed and living condition. *Cytologia* 11(2): 261-281. 1940.—A Golgi apparatus prepared by the proteolytic enzyme-Nile blue sulfate technique accords fully with that after Kolatschew's method. The technique shows that the zymogen granules contain a certain lipid substance. The lipid substance of the Golgi apparatus remaining in the acinar cells after the trypsin digestion is insoluble in acetone and is easily dissolved in alcohol, indicating a lecithin-like substance not contained in the hepatic cells of the same animal and the newt.—Taylor Hinton.

6214. WORLEY, ELIZABETH K. A study of the sperm-forming components in three species of Decapoda. *Celulæ* 48(2): 147-176. 3 pl., 13 fig. 1939.—The sperm-forming components were studied in *Pagurus pollicaris*, *Libinia emarginata*, and *Homarus americanus*. Granular and rod-shaped (*Pagurus*) mitochondria are traced in all 3 spp. In the spermatids of *Libinia* and *Pagurus*, the mitochondria unite into a ring; in *Homarus*, the mitochondria first become filamentous, then associate in the middle region. The mitochondrial ring and the radial processes are homologous with the nebenkern sheath of the flagellate sperm. The complete history of the centrioles is traced in *Homarus*. The distal centriole gives rise to different parts of the mature sperm in each of the 3 species. The proximal centriole forms the axial rod in *Homarus* and *Pagurus*, while in *Libinia*, it gives rise to the medial process. Discrete, cup-shaped dictyosomes are present in the spermatogonial and spermatocyte stages of *Libinia*, *Homarus* and *Pagurus*. In the spermatid of

Libinia, 1 (or 2) droplets appear. During the first spermatocyte prophase in *Homarus* and *Pagurus*, numerous droplets are formed. In *Libinia* and *Homarus*, fusion produces a single droplet of dictyosomal origin which becomes located on the distal capsule wall. The chromophobie, outer portion of this body forms the central tube and the chromophilic core becomes the distal aperture of the central canal. The numerous droplets present in the *Pagurus* spermatid fuse into 1 large mass which becomes the central tube. These bodies are probably the "capsule bodies" of Koltzoff. The central tube in all 3 species and the distal aperture in *Homarus* and *Libinia* are homologous with the acrosome. The central canal develops from the finger-like projection in *Pagurus*; from the finger-like projection and the chromophilic core of the distal droplet in *Libinia*; from the finger-like projection, the distal centriole and the chromophilic core of the distal droplet in *Homarus*. The capsule is formed by vacuolation of specialized cytoplasm surrounding the secretion body in *Libinia*; by general vacuolation of the cytoplasm in *Homarus*; and by a concentration of the

secretory mass away from the cytoplasmic wall in *Pagurus*. Homologies can be drawn between structures present in the mature, non-flagellate, decapod sperm and the filiform type only after complete study of spermiogenesis and the origin and ultimate fate of the sperm-forming components.—Auth. summ.

6215. WORLEY, LEONARD G. (Brooklyn Coll.) Microdissection studies of the ciliated epithelial cell. *Jour. Cell. and Comp. Physiol.* 18(2): 187-197. 1941.—Living, isolated, ciliated, simple columnar, epithelial cells of the intestine of *Anodonta cataracta*, *Sphaerium rhomboideum* and *Venus mercenaria* were cut transversely at various levels with a microdissection needle. Cuts proximal to, through and immediately distal to the nucleus did not affect the coordinated metachronal rhythm of the cilia. Similar sections made through the distal 3d of the cell, however, caused a disappearance of the normal coordination of the cilia. This region of the cell is evidently responsible for the maintenance of the normal, metachronal activity of the cilia.—Auth. (courtesy Wistar Bibl. Serv.).

GENETICS

Editors: ORLAND E. WHITE, *Plant*; SEWALL WRIGHT, *Animal*

(See also Entries 6269, 6603, 6623, 6642, 6810, 6873, 7027, 7028, 7036, 7043, 7049, 7050, 7058, 7062, 7064, 7066, 7074, 7086, 7094, 7116, 7152, 7153, 7206, 7209, 7495, 7675, 7740, 7746, 7761, 7770, 7773, 7823, 7827, 7836, 7838, 7841, 7849, 7850, 7854, 7855, 7856, 7857, 7858, 7871, 7887, 7930, 7974, 8017, 8019, 8020, 8029, 8044, 8127, 8128, 8162, 8164, 8192, 8518)

GENERAL

6216. BELGOVSKY, M. L., V. S. KIRPICHNIKOV, and A. A. PROKOFYEEVA-BELGOVSKAYA. [Organization of the cell and the chromosome theory of heredity.] [With Eng. summ.] *Izvestiia Akademii Nauk SSSR, Otdelenie Matematicheskikh i Estestvennykh Nauk, Seria Biol. (Bull. Acad. Sci. URSS. Cl. Sci. Math. et Nat. Ser. Biol.)* 1940(5): 662-687. 5 fig. 1940.—A review of genetic and cytological evidence for the chromosome theory of heredity, as a basis for refutation of Lysenko's views, is presented. A defense of the concept of the gene as a structurally independent unit is also made. Plasmatic inheritance is briefly reviewed. The viewpoint that chromosomes differentiated in the course of evolution into relatively stable specialized (euchromatin) and labile (heterochromatin) regions, and that the latter effect changes in the former, is expressed. 48 references, of which half are Russian.—I. M. Lerner.

PLANT

6217. ÅBERG, EWERT. (Iowa State Coll.) Viviparous forms of *Agrostis*. *Lantbruks högskolans Annaler* 8: 461-463. 1 fig. 1940.—Two viviparous plants of *Agrostis* are descr. One of them, found at Abisko in Sweden, belonged to *A. tenuis*; the other, from Narvik, Norway, was classified as *A. stolonifera*. Both plants were transplanted at the Agric. Coll. at Uppsala and showed a typical viviparous behavior. These plants are the first deser. viviparous forms of *Agrostis* from Scandinavia.—Ewert Åberg.

6218. ARKHIMOVICH, A. Z. (Causes of biological disparity in seeds from the same beet root glomerule.) [With Eng. summ.] *Zhurnal Inst. Bot. Vuan (Jour. Inst. Bot. Acad. Sci. Ukraine)* 31: 161-166. 1940.—The findings of other investigators as to the heterogeneity of shoots from one glomerule during their development are confirmed. One of the chief causes of this is unequal development of the seeds of the same glomerule. There is a lapse of 1-5 days between the opening of the central and lateral flowers. The delay in the development of the buds and in the opening of the flowers is evidently one of the chief causes of the poorer development of seed forming later on a glomerule. This circumstance is obviously not the only cause of the biol. disparity among the seeds of the same glomerule since an important part is also played by the varied complex of developmental possibilities which each zygote receives from both parents with different combinations of crossing.—Auth. summ.

6219. BOZA BARDUCCI, TEODORO y ROSLAN M. MADOO. (Estac. Exp. Agric. Molina.) Investigaciones acerca del parentesco de la especie Peruana de algodonero *Gossypium raimondii*, Ulbrich. [The parentage of the Peruvian cotton,

G. raimondii.] [With Eng. summ.] *Bol. Dir. Agric. y Ganaderia Min. Fomento [Peru]* 22. 1-55. 3 maps, 5 pl., 50 fig. 1941.—Cf. *Biol. Abstrs.* 15(8): 1487, Entries No. 16232 and 16233. 1941.—*G. raimondii* is completely described. It is found in the Departments of Cajamarca and La Libertad in northern Peru. Reports of its occurrence in Lambayeque have not been confirmed, reports of its presence in Ancash have been disproved. Although it exists side by side with *G. peruvianum* (*G. barbadense*), no natural hybrids between the 2 spp. have ever been observed. *G. r.* has $2n=26$ chromosomes and 13_{II} at first metaphase. A new hybrid, *G. thurberi* \times *G. r.*, has $2n=26$ chromosomes and a chromosome conjugation of 13_{II} in 19 p. m. c. and $12_{II}+2_{I}$ in 2 p. m. c. The hybrid is intermediate and fertile. *G. r.* \times *G. armourianum* gave good seeds although no plants were raised. *G. r.* \times *G. harknessii* gave 7 empty seeds from one boll. Hybrids of *G. r.* with *G. barbadense* and with *G. purpurascens* showed $2n=39$ chromosomes in somatic tissue. The hybrid *G. r.* \times *G. hirsutum* shows $2n=39$ chromosomes and the chromosome conjugation $12.57_{I}+11.65_{II}+0.87_{III}+0.125_{IV}$. It is vigorous, intermediate, and one plant has been grown from unfertilized bolls. *G. r.* is grouped with *G. armourianum*, *G. aridum*, *G. harknessii*, and *G. thurberi* since it possesses chromosome homology and behaves like these spp. in hybridization. *G. davidsonii* and *G. klotzschianum* form a sub-group of $n=13$ chromosomes. From chromosome conjugation and hybridization behavior, it appears that the relationship of *G. r.* to *G. sturtii*, *G. anomalum*, *G. stockii*, *G. herbaceum*, and *G. arboreum* is rather distant. 37 references.—W. C. Tobie.

6220. COOK, R. C. The "Shade" of grape-seeds-to-come—a correction. *Jour. Heredity* 32(7): 240. 1941.

6221. DOMINGO, WAYNE E. (Utah Agric. Exp. Sta.) Bulk emasculation and pollination of smooth bromegrass, *Bromus inermis*. *Jour. Amer. Soc. Agron.* 33(11): 993-1002. 1941.—Bulk emasculation of smooth bromegrass is possible because of the differential between the thermal death points of the staminate and pistillate organs and the fact that functional stigmas are extruded from the glumes of florets treated at temps. sufficiently high to kill their pollen. Emasculation was effected with both hot water and hot air treatments; the former yielded the more consistent results. Hot water treatments between 45° and 49° C on more than 40 panicles of relatively self fertile genotypes a few days prior to normal anthesis decreased selfed seed set to less than 1 seed per panicle and permitted an av. production of 52 seeds per panicle exposed to atmospheric pollen. Bulk pollen transfers were made to unemasculated panicles of relatively self-sterile genotypes by 6 methods, 5 of which resulted in the production of significant ams. of hybrid seed. The possibility of combining bulk emasculation and

bulk pollination procedures in a bulk hybridization program is suggested. Under conditions existent in kraft isolation bags at the time of normal anthesis in the field, the pollen of smooth bromegrass lost much of its viability within 24 hrs. after being shed.—W. E. Domingo.

6222. ETCHECOPAR, JUAN, y ENRIQUE SÍVORI. (*Agric. Exp. Sta. Pergamino, Argentina.*) Notas sobre el mejoramiento del girasol. [Notes on the improvement of the sunflower.] *Rev. Argentina Agron.* 8(3): 252-260. 2 pl. 1941.—The authors explain the methods used in emasculation, selfing and crossing. The results obtained and their effects on the plant are given. Discussion of the improvement of this plant in relation to its economy in Argentina is set forth. A bib. of 23 titles is appended.—J. W. Gilmore.

6223. GRAM, K., C. MUHLE-LARSEN, C. SYRACH LARSEN, and M. WESTERGAARD. Contributions to the cytogenetics of forest trees. II. *Alnus* studies. *K. Vet. -og Landbohøjskole Aarsskr. [Copenhagen]* 1941: 44-58. 1941.—Chromosome numbers of *Alnus glutinosa*, *A. incana*, *A. hirsuta*, *A. tenuifolia*, *A. tenuifolia* var. *occidentalis*, *A. rubra*, *A. cordata* are $2n=28$. In trees cultivated under the names *A. subcordata*, *A. japonica*, and *A. orientalis* $2n=42$ and in one individual of *A. subcordata* $2n=56$. The numbers were detd. in root-tip mitoses. The meiosis was regular in the diploid spp., very irregular in the triploid types, and regular, apart from the formation of some few tetrasomes, in the tetraploid *A. subcordata*. The triploid types are regarded as hybrids between diploid and tetraploid spp. The triploid forms, cultivated in various botanical gardens under species names, are evidently spontaneous hybrids which are grown uncritically under the name of the mother plant. In addition to *A. subcordata*, according to other authors, *A. japonica* and various forms of *A. glutinosa* are tetraploid; the hybrid between *A. subcordata* and *A. glutinosa* (*A. spaethii*) is likewise tetraploid. The importance of maintaining the pure spp. in the botanical gardens through seed from controlled pollination or through vegetative propagation is pointed out. A list is given of a number of exptl. produced hybrids between diploid spp. and between the tetraploid *A. subcordata* and diploid spp.—M. Westergaard.

6224. HAYES, H. K., R. P. MURPHY, E. H. RINKE, and C. BORGESON. Minhybrid corn varieties for Minnesota. *Minnesota Agric. Exp. Sta. Bull.* 354. 1-40. Map, illus. 1941.—The general method of the development and testing of hybrid field corn in Minnesota is given briefly. 14 new double crosses are described. At least one is adapted in each of the 5 different adaptation or maturity zones in Minnesota. The parental lines of these hybrids were developed primarily by pedigree selection within single crosses whose parents were selected for their desirable agronomic characters and were unrelated. These hybrids were tested for 3 yrs. before they were released to seed producers. From 1 to 2 years of this period of testing consisted of predicted double cross yields from the yields of single crosses.—R. P. Murphy.

6225. KNIAZINICHEV, M. I. (Biochemical variation and its significance in breeding food crops.) [With Eng. summ.] *Vestn. Sotsial. Rast. (Soviet Plant Industr. Record)* 1: 89-103. 1940.—Food crops (cereals, legumes, tuber crops, oleiferous plants, etc.) are characterized by marked variability with respect to chemical composition: (1) as between separate elements of the harvested crop (kernels, tubers, etc.); (2) as between plants belonging to one and the same var.; and (3) as between small individual exptl. plots. The range of variation of chemical characters depends on the crop, the var., and the places where plants are grown, etc. Variability in the chemical composition of individual kernels, tubers, etc., within the limits of a single spike, clone, etc., must be due to individual peculiarities of each crop (var.) in setting its fruits, which is closely linked with the biology of their development. Variability as between plants belonging to any given var. is due to 2 causes: (a) lack of homogeneity as regards soil and other microfactors under field conditions; and (b) lack of genotypal homogeneity of standard vars. as regards chemical characters, as a consequence of which, from such vars. it is possible to bring out new vars. having either a lower or higher content of the various substances. Variability in chemical composition as between small individual exptl. plots is due chiefly to lack of uniformity of the plots as regards fertility of the soil.

Hence, selection of lines is possible only relative to the standard (control plots), compared to which the tested lines may be arranged in order according to their content of any given chem. substance. Comparison of vars. as regards their absolute content of chemical substances may be made only by comparative sowings over a number of years on large plots with numerous repetitions, care being taken in the choice of land and use of proper methods of cultivation. Biochemical evaluation of hybrid material may also be made only relative to the parental forms by means of frequency curves.—Auth. summ.

6226. KROTOV, A. S. (On improving self-pollinated varieties.) [With Eng. summ.] *Vestn. Sotsial. Rast. (Soviet Plant Industr. Record)* 1: 22-26. 1940.—In 1936 expts. were conducted on intravarietal hybridization and repeated selection within vars., using several vars. of spring and winter wheat. In 1937 the hybrids thus obtained were subjected to "training" under conditions of sowing in widely spaced rows. Intravarietal hybridization, training, and selection tended to increase the yield of wheat vars.; the effectiveness of these methods differed in different vars. and even in different plants of the same var.; the hybridization was most effective when the plants were emasculated and wind-pollinated; training was more effective on material that had been subjected to intravarietal hybridization.—From auth. summ. by Freeman Weiss.

6227. MENDIOLA, N. B. (Coll. Agric., Philippines.) Behavior of some hidden bud variations. *Philippine Agric.* 30(6): 439-464. 11 fig. 1941.—In previous papers by the author (1933, 1939), it was assumed that most bud mutations are due to traumatic causes. Additional cases of hidden bud variations which the author uncovered in several expts. and observed previously are here reported. Some of these cases are apparently new or nascent. The interpretations of exptl. evidences obtained lend support to the method of improvement suggested by the author, based on the utilization of hidden and traumatic bud variations and involving asexual propagation with increased number of asexual generations and propagating units.—Miguel Manresa.

6228. PAL, B. P. (Imp. Agric. Res. Inst., New Delhi.) Genes: atoms of heredity. *Indian Farming* 1(6): 270-273. 1 fig. 1940.—Discusses our present knowledge of principles of genetics, character of genes, nature of inheritance, variation, mutations. Expts. using colchicine on several crop plants, especially with chillies, have produced striking results. Polyploid chilli plants are more vigorous, and have larger leaves and flowers, than the diploid plants.—Laura Gano.

6229. PLATT, A. W., J. G. DARROCH, and H. J. KEMP. (*Dominion Exp. Sta., Swift Current, Sask.*) The inheritance of solid stem and certain other characters in crosses between varieties of *Triticum vulgare*. *Sci. Agric.* 22(4): 216-224. 1941.—Stem solidness was found to be controlled by 3 factor pairs in Thatcher (hollow) \times S-615-11 (solid) and Renown (hollow) \times S-615-9 and S-633-3 (both solid). Solidness was recessive, the factors appeared to be cumulative in nature and 4 or more dominant genes resulted in phenotypically hollow plants. In these crosses resistance to *Puccinia graminis tritici* was governed by a dominant factor for resistance and an inhibitor, while in Thatcher (res.) \times S-633-23 (suscep.) several factors were involved. Awning and glume color were monogenic. Neither rust reaction nor glume color was associated with solidness. Awning was associated with solidness in Renown \times S-615-9 but not in Thatcher \times S-615-11.—A. W. Platt.

6230. PRUVEY, H. The transmission of characters between *Rhododendron haematodes*, Franch; and *Rhododendron fortunei*, Lindl. *Nation. Hort. Mag.* 20(3): 208-210. 1941.

6231. SHMUCK, A., and A. GUSEVA. (Acad. Sci. U. S. S. R., Moscow.) (The biological activity of isomeric compounds. I. The action of isomeric naphthalene derivatives upon plants.) [With Eng. summ.] *Biokhimiia* 5(2): 129-132. 1940.—Naphthalene shows very weak polyploidogenic influence on plants; some of its derivatives are very effective. All the active derivatives belong to the α series of isomers; the corresponding β isomers are inactive. A polyploidogenic influence was demonstrated for α methyl-naphthalene, α chloronaphthalene, α bromonaphthalene, α iodonaphthalene, α naphthylcyanide, the ethyl ester of a

naphtholic acid, and the methyl ester of a naphthol.—*C. C. Nikiforoff.*

6232. SHULYNDIN, A. (On choosing the mother plant in hybridization.) [With Eng. summ.] *Vestn. Sotsial. Rast. (Soviet Plant Industr. Record)* 1: 50-57. Illus. 1940.—Differences in the progeny from direct and reciprocal crosses in *Triticum* were studied. The data here given refer to the following combinations: *lutescens* 062 \times *erythrospermum*; *erythrospermum* \times *lutescens* 062; *Kitchener* \times *lutinflatum*; *lutinflatum* \times *Kitchener*; *Balaganka* \times *Pusa* 52; *Pusa* 52 \times *Balaganka*. The author on the basis of the behavior of the *F*₂, which exhibited marked differences in a number of characters, concludes that in crossing field crops it makes a difference which form of any chosen pair is taken as a mother plant.—*Auth. summ.*

6233. SMITH, LUTHER. (*Missouri Agric. Exp. Sta.*) An inversion, a reciprocal translocation, trisomics, and tetraploids in barley. *Jour. Agric. Res.* 63(12): 741-750, 9 fig. 1941.—A survey was made of breeding material of *Hordeum* to determine the possibilities of this crop plant as a source of variants and favorableness for cytological study. The irregularities observed included an inversion which produced bridges in about 20% of the pollen mother cells, but had no appreciable effect on seed set. A reciprocal translocation was found, and plants heterozygous for it had about 65% of a perfect seed set. Three trisomic plants were discovered and examined at meiosis, at which stage "mis-division" and other irregularities were noted. One of 8 mutants had a meiotic peculiarity. Observations were also made on the meiotic behavior and fertility of 3 tetraploid strains. They were from 35% to 64% fertile.—*Luther Smith.*

6234. SWAMIRAO, R., M. P. NARASIMHARAO, and S. T. RAMASWAMI. (*Agric. Res. Sta., Lam. P. O., Guntur, India.*) Emasculation in chillies (*Capsicum* genus). *Current Sci.* 10(6): 296, 2 fig. 1941.—A quick method of emasculation of the epipetalous flower is descr.—*R. A. Muttkowski.*

6235. WORSCHITZ, FEDERICO. Accion biologico de las radaciones en relacion con la produccion de mutaciones en los vegetales. [The biologic action of radiations in relation to the mutations in plants.] *Agronomia [Buenos Aires]* 30 (1): 37-50, 6 fig. 1940.—The author presents some general observations on mutation and modification in plant morphology, and affirms that the effective rays are those of the spectrum lying between the beginning of the ultra-violet and the x-rays. The mutations vary both in quantity and quality with the variation in dosage and the stage of condition of the vegetative material under trial. Details of effect are discussed and figured and observations are recorded.—*J. W. Gilmore.*

ANIMAL (EXCEPT MAN)

6236. BREHME, KATHERINE S. (*Carnegie Inst., Cold Spring Harbor, N. Y.*) Development of the Minute phenotype in *Drosophila melanogaster*. A comparative study of the growth of three Minute mutants. *Jour. Exp. Zool.* 88 (1): 135-160. 1941.—The Minute factors in *D. melanogaster*, although occupying different genetic loci, produce a similar phenotype, characterized by reduced adult bristles, small body size and prolonged developmental period. Larval growth of 3 Minute heterozygotes, *M*(3)*w*, *M*(3)*Fla* and *M*(2)*l*², has been studied by measurement at the beginning and end of each instar at 25° C. In all cases, semi-logarithmic curves of length and of width plotted against time, show that growth of the Minutes is of the same type as that of the wild type, but that the Minutes grow more slowly and reach their asymptote later. Relative growth curves show that wild-type larvae grow faster for a shorter time and attain approx. the same size as the Minutes by the time of puparium formation; the curves of all three Minutes and of wild type are almost identical. *M*(3)*w* and *M*(3)*Fla* differ from the wild type in the ratio of length to width at the time of hatching, an indication that the Minute effect begins in the embryonic period. The surface area of the adult wing cells of *M*(3)*w*, *M*(2)*l*² and *M*(1)*n* was smaller than the wild type. Wing area of *M*(3)*w* is significantly smaller than that of the controls, and it seems probable that the reduction in cell size is sufficient to account for the reduction in wing size.—*Auth. (courtesy Wistar Bibl. Serv.).*

6237. GOODALE, H. D. (*Mt. Hope Farm, Williamstown, Mass.*) Progress report on possibilities in progeny-test

breeding. *Science* 94(2445): 442-443. 1941.—This report deals with an expt. in increasing the body wt. of mice, first reported in the Journal of Heredity for Feb., 1938. The expt. has been continued through 14 additional chronological groups with continued increase in body wt.—*E. J. Umberger.*

6238. HADORN, ERNST. (*U. Zurich.*) Praedetermination des Letalitätsgrades einer *Drosophila*-Rasse durch muetterlichen Genotypus. *Rev. Suisse Zool.* 47(7): 167-176. 1940.—In the balanced system, *lgl* *cn bw* *sp*²/*Cy*, *Cy*/*Cy*- is lethal and causes death before hatching; *lgl*/*Cy*- individuals develop normally; *lgl*/*lgl*- is also lethal. *lgl*/*lgl*- individuals died either in early embryonic stages or at the end of larval development. The time at which the *lgl*/*lgl*- individuals died was found to be predetermined by the genotype of the mother.—*D. S. Farner.*

6239. KARP, M. L. [Inbreeding and heterosis.] *Izvestia Akad. Nauk SSSR, Otdel. Mat. i Estestvennykh Nauk. Ser. Biol. (Bull. Acad. Sci. URSS, Cl. Sci. Math. et Nat. Ser. Biol.)* [With Eng. summ.] 1940(2): 219-250. 1940.—Inbred strains of *Drosophila melanogaster*, with cross-over suppressors in the first 3 chromosomes, were compared with respect to viability, longevity, and fertility, in an effort to determine the effect of individual chromosomes or parts of chromosomes on these given characters. Flies of 86 types were investigated, 125,000 flies and 50,000 eggs being examined. Differences in the above characters were found to be caused by the homozygous or heterozygous condition of certain chromosomes. Flies heterozygous for a single pair of chromosomes had greater viability, fertility, and longevity than those homozygous. Heterozygosity for 2 pairs of chromosomes had even more favorable effect. In general, with regard to all the characters studied, the more homozygous flies ranked lower than the less homozygous ones. Though confirming the general correctness of the explanation that heterosis is due to heterozygosity, the investigation produced some data not in harmony with this concept. In a number of cases flies having definite parts of chromosomes, marked by recessive genes, in a homozygous condition were not less—sometimes more—viable and productive than individuals heterozygous for those same regions. Cases of pronounced changes in the cumulative effect of genes were observed to be caused by new combinations of genes.—*From auth. summ. by J. T. Baldwin, Jr.*

6240. ORR, ROBERT T. (*California Acad. Sci.*) Yellow mutation in the California meadow mouse, *Microtus californicus* (Peale). *Wasmann Collector* 4(4): 129-130. 1941.—The author secured 3 young meadow mice in the wild, all believed to have been born in the same litter, and all "yellow." It is probable that as in other species this yellow condition has appeared as a result of a change in the factor controlling the extension of melanin pigment to the fur. This as a result produces a restriction of this pigment largely to the eye with but a small amount in the fur in contrast to the allelomorphic dominant which produces a normal extension of melanin pigment to the hairs.—*R. T. Orr.*

6241. SNELL, GEORGE D. (*Bar Harbor, Maine.*) Induction by roentgen rays of hereditary changes in mice. *Radiology* 36(2): 189-196, 6 fig. 1941.—A review of previously reported expts. on the induction of hereditary changes (especially translocations) by irradiation of ♂♂ with either X-rays or neutrons and of ♀♀ with X-rays.

6242. SONNENBLICK, B. P. (*Queens Coll., Flushing, N. Y.*) Germ cell movements and sex differentiation of the gonads in the *Drosophila* embryo. *Proc. Nation. Acad. Sci. U. S. A.* 27(10): 484-489. 1941.—The germ cells have been traced from the time of their origin to their inclusion in the primitive gonads. Many germ cells which appear in the early embryo never reach the gonads. Size differences in the gonads have been observed and it is concluded that no indifferent stage in the development of the gonad exists.—*Author.*

MAN

6243. ABBOTT, LYNN D. F. Jr. (*Med. Coll. Virginia.*) Alcaptonuria in a Negro family. *Science* 94(2442): 365-366. 1941.—A report of the occurrence of alcaptonuria in 2 children of a Negro family was presented. Other members of the family were found to be unaffected. This is the first evidence that alcaptonuria exists in the American Negro.—*E. J. Umberger.*

6244. FINNEY, D. J. The detection of linkage. III. Incomplete parental testing. *Ann. Eugenics* 11(2): 115-135. 1941.—Methods developed in previous papers of this series are extended to cases where the phenotypes of one or both parents are unknown in respect of one of the genetic factors under test. This is achieved by the use of estimated population frequencies of the genes concerned in the compiling of a composite score for each family representing contributions from different hypothetical parental combinations. Formulae are given for estimating the probabilities of these various combinations from the phenotypes of the children. Expressions for the information on linkage provided by any family on the linkages discussed in Part I of this series are developed. In a detailed examination of family data on sex and MN blood type, it is shown that, even when neither of the parental blood types is known, the Penrose sib-pair linkage test extracts only about $\frac{1}{3}$ of the available information on the possibility of a sex-linkage of this factor. This loss is much greater when one or both parents are described for their blood types. Similar conclusions may be expected for other linkage tests, and use of the efficient methods of the present paper should therefore repay the additional computational labor. By the use of empirical variances of composite scores, these methods of analysis may be further extended to data in which there is incomplete parental testing for both genetic factors under examination.—D. J. Finney.

6245. KUBO, TADAO. (Taihoku U.) Über den Vaterschaftsnachweis auf Grund von Ähnlichkeitsgraden der Fingerleistenmuster. *Jap. Jour. Med. Sci. VII. Social Med. and Hyg.* 3(3): 181-183. 1940.—An abstract.

6246. KUBO, TADAO. (Taihoku U.) Über die Erblichkeit der Radialschleife. *Jap. Jour. Med. Sci. VII. Social Med. and Hyg.* 3(3): 183. 1940.—An abstract.

6247. MACCONAILL, M. A. The classification of hair and eye colour upon developmental and genetic bases. *Ann. Eugenics* 11(2): 173-178. 1941.—Four adult types of pigmentation are recognized: they are the different end-stages of 9 developmental types, distinguished by their times of appearance in the post-natal growth period. The 9 formulae which express the order of sequence of appearance of the

developmental classes correspond to the 9 formulae of the genotypes to be expected if hair and eye colors are linked.—M. A. MacConaill.

6248. PENROSE, L. S. A contribution to the genetical study of phenylketonuria. *Trans. Roy. Soc. Canada Sect. 5* 35: 81-83. 1941.—An interesting recessive metabolic abnormality, phenylketonuria, first described in Norway, has not hitherto been noticed in the Canadian literature. The condition is suitable for genetic linkage study because segregation is sharp between normals and abnormals. The present communication describes a Canadian family in which 2 sibs are affected. Investigation of the distribution of the *ABR* allele series in this family does not suggest that the *ABR* locus is linked with the gene which causes phenylketonuria. The new material, however, can be compared usefully with that collected by previous workers.—L. S. Penrose.

6249. RIDDELL, W. J. B. (Glasgow, Scotland.) Uncomplicated hereditary megalocornea. *Ann. Eugenics* 11(2): 102-107. 1941.—A pedigree of uncomplicated megalocornea is descr. containing an affected ♀ with unaffected parents. The horizontal corneal diam. of the unaffected members and normal controls did not differ significantly, but the affected members showed a significant difference both from normal members and from the control group. As the history suggested the presence of sex-linkage the color perception was investigated, with negative results. Attention is drawn to the possibility that sex-linked uncomplicated megalocornea may pass unrecorded in the community and thus explain the sex difference which has been reported by other observers in the size of the cornea. The presence of such a factor would be of great interest in the study of human linkage relationships.—W. J. B. Riddell.

6250. STRANDSKOV, HERLUF H. (U. Chicago.) Human gene symbols. *Science* 94(2442): 366-367. 1941.—The following symbols are suggested to indicate the genes responsible for the presence or absence of isoagglutinogens A and B and for the M and N agglutinogens: I^A —isoagglutinogen A; I^B —isoagglutinogen B; i —absence of A or B; A^m —agglutinogen M; A^n —agglutinogen N.—E. J. Umberger.

BIOMETRY

JOHN W. GOWEN, *Editor*

(See also Entries 6244, 6262, 6263, 6323, 7199, 8135)

6251. BABITZ, MILTON, and NOEL KEYS. (U. California.) A method for approximating the average inter-correlation coefficient by correlating the parts with the sum of the parts. *Psychometrika* 5(4): 283-288. 1940.—The average inter-item correlation, which represents the internal consistency of a test, yields a unique estimate of test reliability. A close approximation to this average is given by a formula which requires the correlation of each item with the total score and the standard deviation of each item. The formula is especially useful in those instances where the number of items is small and where the variation in item sigmas should not be neglected.—Authors.

6252. BLISS, C. I. (Agric. Exp. Sta., New Haven, Conn.) Biometry in the service of biological assay. *Indust. and Engineer. Chem. Analyt. Ed.* 13(2): 84-88. 1941.—The author presents and discusses 5 characteristics of a valid biol. assay. Modern statistics may be expected to give more precise results with fewer animals, and a measure of just how far a given determination should be trusted, whether it occurs in a routine assay or in developing a new medicinal product.—C. G. Barr.

6253. CHARNLEY, F. Some properties of a composite, bivariate distribution in which the means of the component normal distributions are linearly related. *Canadian Jour. Res. Sect. A. Phys. Sci.* 19(12): 139-151. 1941.—Equations relating the statistics of a linear, composite, bivariate, normal distribution with those of the component distributions are derived for 2 types of data; first, for the special (ideal) case when the means represented by the samples correspond to the points of the linear continuum, and the proportions of the component populations remain constant and, 2d, for

the practical case when the point set representing the means of the component distributions from which the samples have been drawn differs from the linear continuum, and the proportions or densities of the component populations vary along the line of relation. If the component populations are normal and the variances and correlation coefficient in the component populations are constant, we can calculate at most only 2 of the parameters of the component populations from the composite data. We can, however, always calculate the values of the slope of the line of relation and the vertical variance around this line irrespective of the functional forms of the component populations, providing the means of the latter are collinear and provided also that the data can be separated into subgroups corresponding to single populations. The use of the equations is illustrated by means of a composite distribution constructed from a known component distribution.—Auth. abst.

6254. DUNLAP, JACK W. (U. Rochester.) Note on the computation of tetrachoric correlation. *Psychometrika* 5(2): 137-140. 1940.—Methods are presented for the use of the Hollerith tabulator in computing tetrachoric correlation coefficients. The suggestion may be useful where large numbers of inter-correlations are desired.—H. D. Landahl.

6255. FINNEY, D. J. The joint distribution of variance ratios based on a common error mean square. *Ann. Eugenics* 11(2): 136-140. 1941.—The distribution function of the ratios of a set of mean squares with the same number of degrees of freedom to an independent mean square is found, all the mean squares being derived from normally distributed observations. By the use of differential operators the proba-

bility integral for the largest of these ratios is obtained. Significance levels for some simple cases are given, but the computation becomes tedious, on account of the complexity of the integral, when the degrees of freedom or the number of ratios increase. An approximation, which is likely to be sufficiently close for practical purposes, is discussed. The corresponding approximation for the smallest of the ratios is much more accurate. Generalizations of the problem are briefly mentioned.—D. J. Finney.

6256. FISHER, R. A. The negative binomial distribution. *Ann. Eugenics* 11(2): 182-187. 1941.—The cases of the positive and negative binomial distributions, in spite of their algebraic similarity, are very different in their applications and in the statistical problems to which they give rise. With the negative binomial we ordinarily require to estimate the exponent in addition to the mean of the distribution. This can be done from the first 2 moments, but the process has been recognized as inefficient, and in the present note the theoretical efficiency is calculated so as to make it easy to judge in practical cases whether a more exact fitting by maximal likelihood is required.—R. A. Fisher.

6257. HALDANE, J. B. S. The fitting of binomial distributions. *Ann. Eugenics* 11(2): 179-181. 1941.—A binomial law can readily be fitted to observed data by the method of maximum likelihood.—J. B. S. Haldane.

6258. JEFFREYS, HAROLD. Some applications of the method of minimum χ^2 . *Ann. Eugenics* 11(2): 108-114. 1941.—The use of the method of minimum χ^2 for estimation is illustrated by numerical applications to 3 types of problems where the data are frequencies: (1) a Poisson distribution (2) two negative binomial distributions (3) a case where no suggested law of chance is available but a certain amt. of smoothing is permissible. In the last the method is combined with a method of smoothing that has been found useful in seismological work.—Harold Jeffreys.

6259. TUCKER, LEDYARD R. (U. Chicago.) A matrix multiplier. *Psychometrika* 5(4): 289-294. 1940.—A machine to expedite matrix multiplication has been developed by modifying the Internat. Business Machines Corp. scoring machine. The principles and operation of the machine are described, and time and accuracy estimates are indicated.—L. R. Tucker.

HUMAN BIOLOGY

(See also Physical Anthropology and Entries Detection of linkage, 6244; Classification of eye and hair color, 6247; Effect of high barometric pressure on man, 6280; Human tuberculosis and Vitamin deficiency, 6517; The frontal lobes and consciousness of self, 6894; Training as affecting vascular responses, 6899; Cancer research program, 7066; Heredity of suscept. to tuberculosis in rabbits, 7495; Puerperal fatality, 7516)

6260. CHENOWETH, LAURENCE B., and RICHARD G. CANNING. Relation of season of birth to certain attributes of students. *Human Biol.* 13(4): 533-540. 1941.—Freshman ♂ students at the Univ. of Cincinnati have shown a secular growth in size since 1917. Studies of students born between 1904 and 1921 indicate that the tallest and heaviest were born in the late winter and spring months. Other attributes seemed to follow the "basic animal rhythm," described by Ellsworth Huntington.—Authors.

6261. DAMON, A. Physique in hereditary mental defect: an anthropometric study of 97 "Old American" female morons. *Human Biol.* 13(4): 459-472. 1941.—Metric constants are presented for 97 adult ♀ hereditary morons, of Old American descent, in State institutions in Mass., Conn., R. I., and New York. Comparisons with 4 normal series of similar age, sex, and race (1 by Hrdlicka, 2 college groups by I. G. Carter, and an unpublished series from the Harvard Anthropology Lab. files, approximating more closely the morons' socio-economic status) show these significant differences: 1) The morons are smaller in most measurements, especially long ones. Among other traits, biaxial diam., chest breadth, relative sitting height, and cephalic index do not differ. The morons' chest depth, upper face height, and associated indices are larger. 2) Morphologically, mild "stigmata of degeneration" are found: low, sloping forehead, strong prognathism, receding chin, narrow temporals, marked asymmetry. The ear lobe is much larger; lips are thick; hair development is weak and graying slight; linear body build predominates greatly over lateral. 3) The morons are more variable than normal groups, especially in indices and head dimensions.—A. Damon.

6262. DUBLIN, L. I., and M. SPIEGELMAN. Current versus generation life tables. *Human Biol.* 13(4): 439-458. 1941.—A "generation" life table records the mortality, survivorship, and mean after-lifetime of a generation actually traced from birth until the entire group is accounted for by death. A "current" life table uses mortality observed at each age of life in a population existing within a fixed year or period to construct a hypothetical table of survivorship from birth to successive ages, and of mean after-lifetime remaining at successive ages. Generation life tables were computed for generations born in England and Wales and in the U. S. at several dates and compared with the life tables current in the year of birth. For generations born since the last quarter of the past century, the mean after-lifetime actually experienced is greater than that indicated by the life table current for the yr. of birth. Thus, the expectation of life at birth for ♀ in England and Wales in 1876 was 44.6 yrs., while their mean after-lifetime on the basis of actual experience is 50.6 yrs. About

30% of the persons alive today at age 65 owe their existence to the advances of science and standards of living that have contributed to reduce mortality since their birth.—Authors.

6263. JUNG, F. T. A statistical phenomenon involving hair-color and physical types. *Human Biol.* 13(4): 541-545. 1941.—Data from a study of puberty appeared to show that dark-haired boys passed through puberty earlier than light-haired boys. This proved to be a statistical illusion, for the data also indicated that the hair darkened rapidly in the range of ages studied.—F. T. Jung.

6264. KARPINOS, BERNARD D. (U. S. Publ. Health Serv.) The socio-economic and employment status of urban youth in the United States, 1935-1936. *Publ. Health Bull.* 273. 1-58. 1941.—Based on data of the National Health Survey, this study presents a detailed analysis of the employment, educational, and occupational status of urban youth in the U. S. The study establishes not only the relationship between the education and occupation of youth and their employment, but relates as well, employment to annual family incomes. The existence of wide differences in the employment of youth in the various income classes is for the first time revealed by the present analysis. The study likewise discloses a direct association between education of the white youth and their employment; the data indicate striking increase in employment with higher education. The contrary is true of the colored youth: their employment generally decreases with higher education. Furthermore, the study brings out the close connection between economic status, education, and occupation. Detailed distribution of youth by economic status, availability for the labor market, employment status, education, and occupation are given in terms of sex as well as race.—B. D. Karpinos.

6265. MOORE, MERRILL (Harvard Med. Sch.), ALICE F. RAYMOND (Riggs Found., Stockbridge, Mass.), and MILDRED G. GRAY (Washingtonian Hosp., Boston). Alcoholism and the use of drugs. A review of 841 cases diagnosed "with psychosis due to drugs and other exogenous toxins" or "without psychosis: drug addiction." *Quart. Jour. Stud. Alcohol* 2(3): 496-504. 1941.—Alcoholism and the Use of Drugs have many features in common. Both appear to result from basic psychological instability. Among 115,845 admissions to Massachusetts mental hospitals between 1917 and 1937, 0.7% of the cases were associated with the excessive use of drugs. There were 15 times this number which were considered by Dayton to be alcoholic psychoses. Many of the drug cases also used large amt. of alcohol. Patients diagnosed "without psychosis: drug addiction" were high in intemperance at the time of first admission.

Among readmitted patients so diagnosed, intemperance was even more common. Among first admissions with psychoses associated with drugs, about 50% of ♂ cases and 25% of ♀ cases were alcoholic as well. The intemperate use of alcohol may be an important precipitating factor in causing readmissions to state hospitals of cases associated with the excessive use of drugs.—*M. G. Gray.*

6266. SHALLOO, JEREMIAH P. (U. Pennsylvania.) Some cultural factors in the etiology of alcoholism. *Quart. Jour. Stud. Alcohol* 2(3): 464-478. 1941.

6267. THOMPSON, WARREN S. (*Scripps Found.*) (assisted by NELLE E. JACKSON and RICHARD O. LANG). Average number of children per woman in Butler County, Ohio: 1930. A study in differential fertility. xi+81p. U. S. Department of Commerce: Washington, 1941.—This study, which is issued through the cooperation of the Bureau of the U. S. Census and the Scripps Foundation for Research in Population Problems, is an intensive analysis of census data on fertility in Butler County, Ohio. The county includes both manufacturing and agricultural areas. This population of 114,084 in 1930 was 74.3% urban, 15.4% rural non-farm, and 10.3% rural farm, and was 91.6% native born white, 3.5% foreign born, and 4.9% Negro, with a negligible number (16) of other colored races. The population studied for fertility was limited to native white first-married women living with their husbands in 1930, and was divided into 4 groups according to residence and place of birth, namely, (1) Northern-born urban, (2) Northern-born rural, (3) Southern-born urban, and (4) Southern-born rural. Fertility, measured by the number of children 0 to 4 yrs. of age, was studied in relation to age of woman at marriage, duration of marriage, rent paid, occupation, birthplace of husband and wife, employment of wife, number of families in dwellings, age of husband, ownership or rental of property. Data on these and some other relations were analyzed for each of the 4 groups mentioned. The relationships revealed by the analysis cannot be easily summarized in a short space, but the following conclusions may be noted: Southern-born women were more fertile than the Northern-born in both urban and rural groups, and the rural women were more fertile than the urban in both the Northern- and Southern-born. Fertility was inversely correlated with rent, although there was little correlation in families paying over \$40 per month. "The poorer rural-non-farm women, like the poorer urban women, had a disproportionately large share of the children." Employed women of all ages had "extremely low fertility." As a whole the study presents a carefully analyzed collection of data on the limited area covered.—*S. J. Holmes.*

6267A. WILLCOX, WALTER F. (*Cornell U.*) Studies in American demography. xxx+556p. 3 maps, 1 fig. Cornell University Press: Ithaca, 1940. Pr. \$4.—This book is essentially an assemblage of the more important writings previously published by the author. The book is composed of 3 main divisions: (1) studies in American Census statistics, (2) studies in American registration statistics and (3) miscellaneous studies. In the first, the author has discussed the problem of determining statistical tests of progress, the best contemporary estimates of the population of the world, history of the American Census and a detailed

discussion of the population of the U. S. including such breakdowns as urban and rural, sex, age, race, native and foreign born, literacy and marital condition. In the 2d division he gives a brief history of American registration statistics, a presentation and evaluation of both crude and standardized death rates, the birth rate and substitutes for it, the seasonal distribution of deaths and births and divorce rates. A chapter each is devoted to the controversial topics, Effect of Marital State upon Death Rate and Alleged Increase of Cancer and Immigration. In the remainder of the book the author discusses such topics as Need of Social Statistics as an Aid to the Courts, and Definitions of Statistics and Demography (including an extensive chronological list of definitions). Biographical sketches of John Graunt, Lemuel Shattuck and John Shaw Billings are given. The author includes a bibliography of his own more important writings.—*R. J. Jessen.*

6268. WOLFF, PABLO OSVALDO. (*Buenos Aires.*) Narcomanías y criminalidad [Narcomanias and criminality.] *Rev. Psiquiatr. y Criminol.* 6(34): 3-24. 1941.—Abuse of drugs is considered as an etiologic factor in crime. From the medical viewpoint, narcomania is a disease rather than a crime, but habituations to cocaine or cannabis are differentiated from opiate addiction. Due to these variations in types of narcomanias, differences between narcomanic criminals and criminal narcomanics may be recognized. The status of control is described for Argentina and compared with that of the U. S. and Canada. The influence of particular drugs on criminality is discussed in detail. Morphine, heroine, opium, cocaine and cannabis are examined in relation to frequency and types of crime, and to degeneration of character. Crimes of violence are rarely committed by morphine addicts, more often by cocaine addicts. Cannabis induces premeditated crimes by removing inhibitions; but in normal men without criminal tendencies, only a condition resembling alcoholic intoxication is produced by cannabis. 43 references.—*G. A. E.*

6269. YATES, NORA, and HERBERT BRASH. An investigation of the physical and mental characteristics of a pair of like twins reared apart from infancy. *Ann. Eugenics* 11(2): 89-101. 1941.—The examination was carried out when the twins were aged 16. One, J.J., has been raised in an urban environment, poorer in all respects than that of his brother J.B., who had lived in a semi-rural environment. The twins were proved to be identical. The twins were closely similar in appearance, but J.J. was markedly inferior to J.B. in height, wt., and health. Indications were obtained, principally from x-ray plates of the long bones, that J.J. was physiologically younger than J.B. Nevertheless he was greatly superior to him in intelligence, a difference in I.Q. of 19 points being obtained. Shortly before the examination J.J. has sustained a perforation of a duodenal ulcer. X-ray plates showed that his stomach was strikingly similar to that of J.B. in shape, size and tone, although J.B. showed no sign of disease. In character and temperament, as revealed by their interests and behavior, the twins showed similarity.—*Authors.*

6270. ANONYMOUS. Population trends in states and cities as shown by preliminary 1940 census figures. *Publ. Health Repts.* 55(38): 1741-1742. 1940.

ANIMAL BEHAVIOR

(See also Entries "Waltzing" of guinea pig, 6873; Conditioned response under nembutal anesthesia, 6962; Reactions of infant to pin prick, 7022; Reflex behavior of newborn infant, 7023; Reaching prehensile behavior of human infant, 7024; Conditioning response in vitamin B₁ deficiency, 7103; Factors affecting attraction of moth to lights, 8174; Host selection in *Rhizopertha* beetle, 8222; Tropisms in rotifers, 8354; Crabs, 8369; Taste sensitivity, wasp, 8450; Reprod. behavior in blenny, 8503; Respiratory behavior in fishes, 8504; Blind fish, 8505; Emotion in birds, 8572; Courtship of bird (*Tympanuchus*), 8573; Nest sanitation by birds, 8577)

6271. BEATTY, CLYDE, and EARL WILSON. Jungle performers. 320p. Frontispiece, 15 pl. Robert M. McBride and Co.: New York, 1941. Pr. \$2.75.

6272. FRINGS, H. (U. Oklahoma.). Stereokinetic and photokinetic responses of *Lycosa rabida*, *Calosoma lugubre*, and *Harpalus caliginosus*. *Jour. Comp. Psychol.* 32(2): 367-377. 1 fig. 1941.—Studies were made of the stereokinetic and photokinetic reactions and reactions to red, yellow and blue bands of light in light-adapted individuals of the wolf-

spider, *L. rabida*, and of two species of ground-beetles, *C. lugubre* and *H. caliginosus*. All were markedly photokinetic, but became akinetic in the dark. The spider was stereoneutral; the beetles exhibited akinetic upon contact with the walls of the apparatus. The latter showed no tendency to become akinetic in one band of light more than another but the beetles showed a greater tendency to come to rest in the red area than in the other two. The author argues that this type of result cannot be used

as certain proof of the presence of color-vision in these species.—*C. W. Brown.*

6273. ANONYMOUS. Development and behavior of the white rat. (Film.) 210 ft., silent, Warden and Gilbert Psychology Laboratory: New York City, N. Y., 1941. Pr. \$13.—Covers the physical and behavioral development of white rat from birth to three months of age. The sensory and motor activities of the young are illustrated for various age levels. The maternal care, and nesting behavior of the adult are also shown.

6274. ANONYMOUS. Problem solving in monkeys. (Film.) 420 ft., silent, Warden and Gilbert Psychology Laboratory: New York City, N. Y., 1940. Pr. \$25.—Covers the behavior of *Cebus* and *Rhesus* monkeys on 2 complex tasks: (1) selecting the proper string among several arranged in patterns on a platform adjacent to the test cage, (2) use of tools (rakes) in securing food placed beyond normal reach. The latter includes the following stages:

(a) use of a single rake, (b) use of a short rake to get another one long enough to reach the food, (c) continuing the problem until 8 rakes in series are used. First demonstration of such complicated tool-using behavior in monkeys.

6275. ANONYMOUS. Testing animal intelligence. (Film.) 460 ft., silent, Warden and Gilbert Psychology Laboratory: New York City, N. Y., 1941. Pr. \$28.—Part 1 illustrates the following tests on the white rat: (1) Hunger drive, using the Columbia Obstruction method, followed by table comparing the various drives; (2) Maze learning on the elevated and Warner-Warden mazes, followed by an animated learning curve. Part 2 illustrates the following tests on the monkey: (1) visual discrimination, using the pulling-in technique; (2) tool-using on single and multiple platforms. It also shows a sample of "neurotic" behavior in the monkey when the problem becomes too difficult for solution.

ECOLOGY

ORLANDO PARK, *General Animal Ecology*
 G. D. FULLER, *General Plant Ecology*
 CHANCEY JUDAY, *Hydrobiology (Oceanography, Limnology)*

FREDERICK A. DAVIDSON, *Ecology of Wildlife Management—Aquatic*
 W. L. MCATEE, *Ecology of Wildlife Management—Terrestrial*

ROBERT G. STONE, *Bioclimatology, Biometeorology*

(Other entries in this issue: [GENERAL AND ANIMAL ECOLOGY]—Food chain in lakes, 6332; pH ranges for *Anopheles* larvae, 7530; Host selection in *Rhizopertha* (beetle), 8222; Diapause in spruce sawfly, 8233, 8234; Cold hardiness of bark beetle, 8237; Quantitative dietary studies with bug, 8248; Insect parasites of wasps, 8254; Pond protozoa, 8310; Protozoan parasites of Orthoptera, 8322; Moulting in Crustacean, 8371; Parasitic copepods, 8374; Populations of *Carcinus*, 8379; Asthenobiosis in *Phlebotomus*, 8423; Ecuadorian butterflies, 8459; Blind fish, 8505; Bird census methods, 8539; Bird congregation Hudson Bay, 8542; Fluctuations in abundance of birds, 8544; Birds and the wind, 8555; Black brant census and eelgrass disease, California, 8558; Shoveller (*Spatula*) of Washington, 8576; Migration of shrike, 8578; Mule deer, 8611. [PLANT ECOLOGY]—Rainfall interception by forest canopies, 6286; Spread of pollen through the air, 7401; Soil organisms and erosion, 7590; Competition between strains of legume-nodule bacteria, 7592; Succession in Tertiary vegetation, 7696; Paleobot. aspects of vegetation bordering deserts, 7697; Post glacial plant migration routes, N. America, 7718; Dispersal of diatoms, 7721; Agaricaceae of Chicago region, 7745; Cytogeography of *Sedum*, 7766; Cacti of Ariz. and Calif. deserts, 7768; Speciation centers of *Ranunculus*, N. America, 7788; Floristics of Arbuckle Mts., Okla., 7792, of Arkansas, 7796; Vegetation of Balcones Escarpment, Texas, 7797; Phytogeography of Sonoran desert, 7798; Vegetational areas of Texas, 7799, of Sonoran desert, 7800; Ecology of ring porosity, 7813; Pasture analysis, 7828; Grass inhibited by dead roots, 7833; *Lespedeza*-black locust as soil-binders, 7851; Cactus eradication, 7893; Wind erosion and roughness of surface, 7900; Soil erodibility factors in Arizona and N. Mexico, 7903; Transpiration of Sahara desert Succulents, 8027; Radiation as affecting ferns and liverworts, 8032; Metabolism of epiphytes and geophytes, 8100; Environm. factors affecting prevalence of soil fungus, 8136)

GENERAL

6276. LINDQUIST, B. Undersökning över några skandinaviska daggmaskarters betydelse för lövförnäns omvandling och för mulljordens struktur i svenska skogsmark. [Investigations of the importance of some Scandinavian earthworms for the decomposition of broadleaf litter and for the structure of mull.] [With German summary.] *Svenska Skogsårsdörför. Tidskr.* 39(3): 179-242. 8 fig. 1941.—The paper deals mainly with *Lumbricus terrestris*, *L. rubellus*, *Allolobophora longa*, *A. caliginosa*, *Eisenia fetida*, *E. rosea*, and *Dendrobaena octaedra*. All of these showed ability to distinguish among the kinds of leaf litter offered to them. Elm, ash, and birch leaves were preferred, oak and beech were not liked as well, and pine and spruce needles were not touched. *L. terrestris* and *A. longa* were most effective in breaking down litter. Introduction of ash, elm, and birch into the forest should favor multiplication of earthworms and consequently improvement of the soil. Activity of the worms resulted in crumb structure of the soil, depending on the size of the soil particles. With most spp. of worms the crumb structure tended to be coarser with increasing content of medium and coarse sand. Dead worms in exptl. vessels caused large increase in the nitrate-N content of the soil. This indicates that worms contribute to nitrification of the soil not only by mixing humus with mineral soil and stimulating bacterial activity, but also through decomposition of their own bodies.—W. N. Sparhawk.

BIOCLIMATOLOGY, BIOMETEOROLOGY

(Other entries in this issue: Water supply and dormancy of animals, 6292; Leaf temps., 6293; Transpiration and evap. by Javanese Mt. forest, 6296; Radiation loss by lakes, 6308; Temp. effects on growth of mammary lobule-alveolar system, 6612; Seasonal effects of hormones on heart muscle in rats, 6656; Seasonal response of crop-sacs to prolactin, 6661; Seasonal and annual

Another Blow Below the Belt

Biological Abstracts had already been hit hard by the war—but since the United States actually has declared war on the Axis countries, we have lost additional subscription income of more than \$5,000 from Europe and the Far East.

In spite of this serious loss of income, we are maintaining our recently adopted policy of publishing abstracts of all the important biological literature as quickly as it is available. In order to do so, however, we have had to dip still deeper into our meager reserve. This cannot continue indefinitely. We still are receiving splendid support from the British Empire but we must look to the United States and South America for the additional support so badly needed to maintain an unbroken record of the biological literature. (See inside front cover of this issue for the section covering your field.)

occurrences of eclampsia, 6817; Temp. effects on gametogenesis in fish, 6830; Seasonal effects on resistance of capillaries in children, 7016; Fever as a seasonal phenomenon, 7017; Weather and growth of chicks, 7280; Seasonal health impairment in fowls in Malay, 7282; Spread of pollen through the air, 7401; Weather, season and pollen abundance in air, Australia, 7402; Seasonal incidence of rheumatic fever, 7486; Retting of flax, 7567; Azotobacter, 7581; Winter-killing of oat vars., southern U. S., 7838; Hygrometer for cotton, 7847; Climate and turpentine yield, 7976; Radiation as affecting ferns and liverworts, 8032; Exptl. cold injury to plants, 8081; Environm. factors affecting prevalence of soil fungus, 8136; Cold hardiness of bark beetle, 8237; Moulting in Crustacean, 8371; Birds and the wind, 8555)

6277. BAUGHMAN, FRED A. (U. S. Weather Bur., Washington, D. C.) Methods of vegetable protection and growth stimulation in the Imperial Valley, California. *Bull. Amer. Meteorol. Soc.* 22(9): 373-374. 1 fig. 1941.—Of the several methods briefly mentioned, the largest increase in maximum temps. was obtained by a combination of paper cap with straight paper brush; the teepee was least effective.

6278. BREESE, A. (U. S. Weather Bur., San Francisco, Calif.), and N. E. BRADBURY (Stanford U.). Note on illumination, climate and radiation intensity. *Bull. Amer. Meteorol. Soc.* 22(8): 319-320. 1 fig. 1941.—Ratio of total radiation to visual illumination in kiloluxes plotted as a function of solar angle for all cloudless days during 1935-36 at Ticks Bay, while indicating some increase in ratio with sun elevation, shows such a wide scattering of observations at a given angle as to indicate no agreement, either in magnitude or variation with Kimball's suggested constant factor of 6700. A comment added by Hand indicates that this

is due to the high latitude of Tiksy (80° N.) and that the factor must vary with solar elevation.—*J. K. Rose.*

6279. COBLENZ, W. W. (*Bur. Standards, Washington, D. C.*) The spectral range of ultraviolet solar radiation useful in biochemistry. *Bull. Amer. Meteorol. Soc.* 22(8): 316-318. 1 fig. 1941.—In the systematic accumulation of climatological data on u.-v. solar and sky radiation it is desirable to use a wider band of wave lengths in order to include most of the biologically effective radiation available. Hence it is advisable to adopt 3200 \AA as the long wave-length limit. This limit is not yet a matter of international agreement but will be used by the author who is a member of the Commission on Solar Radiation.—*J. K. Rose.*

6280. HALDANE, J. B. S. Human life and death at high pressures. *Nature [London]* 147: 458-460. 1941.—Presents an interesting summary of the effects of high atmospheric pressures and of different air compositions on the human body up to pressures of 10 atmospheres. At 10 atm. the effect of density of the air is very striking. "The voice becomes nasal, and the increased resistance of the air is obvious even when the hands are moved, and still more so when attempts are made to stir it. The resistance in the breathing apparatus may be greatly increased, since the volume of air breathed is unchanged, but the mass increases tenfold, and turbulence may develop, increasing the resistance still further." He discusses N_2 intoxication which is not found when H_2 or helium are substituted with the mixture of O_2 . He also shows how CO_2 intoxication takes place readily at high pressures and the onset of convulsions due to O_2 at about 7 atm. pressure. Bubble formation [aeroembolism] during decompression, if this is very rapid, may occur in all parts of the body with resulting asphyxia and death, owing to the blocking of the capillaries in the lung and brain with froth. Rupture of the lungs may even take place. The author does not find that helium when substituted for N_2 is a preventive of decompression troubles, having had some painful experience himself with helium. The expts. were conducted by Dr. Haldane and Dr. E. M. Case on themselves and 20 volunteers, including 4 women.—*C. F. Brooks.*

6281. HOPKINS, J. W. Agricultural meteorology: summer sequence of monthly mean temperature at Winnipeg, Swift Current, and Edmonton. *Canadian Jour. Res. Sect. C. Bot. Sci.* 19(12): 485-492. 1941.—An analysis of the monthly sequence of mean temp. during the summer period, April-Sept., of the years 1894-1937 has been made by expressing each annual sequence as an orthogonal polynomial function of time. Whereas the precipitation sequence, previously studied, required terms of the 4th or 5th degree for its adequate representation, the av. temp. sequence at all 3 stations was very closely approximated by a 3d-degree polynomial. On the average, corresponding coeffs. for each station differ significantly, indicating decreasing continentality of the temp. regime with distance westward from Winnipeg. Annual variations in corresponding coefficients for the 3 locations are appreciably correlated, but for the most part exhibit no regular sequence in time. However, in recent years at Edmonton the mean temp. for April has tended to be lower, and that for July and Aug. to be slightly higher, than previously. There is some suggestion of a feeble inverse correlation in the annual fluctuations of temp. and precipitation.—*Auth. abst.*

6282. HUBERMAN, M. A. (*Northeastern Forest Exp. Sta.*) Why phenology? *Jour. Forest.* 39(12): 1007-1013. 1941.—The historical development of phenology is reviewed. Recent efforts are classified into 3 groups—the construction of calendars and charts without regard to meteorological factors, the correlation of plant and animal activities with meteorological factors, and the applications of the principles of biochimatology.—*S. H. Spurr.*

6283. MAHAJAN, L. D. (*Physics Res. Lab., Mahendra Coll., Patiala.*) An optical hygrometer. *Current Sci.* 10(2): 100. 1941.—An optical hygrometer devised to study the variation in the humidity of the air is descr. To a zinc rod (balance beam), about 1 mm. thick and 10 cm. long, a cup of zinc of 1 cm. square and 2 mm. deep is fixed rigidly to each end. In the middle of the beam, a revolving rod of copper, about 1 mm. thick and 7 mm. long, is rigidly attached at right angles to it. A small spherical mirror of about 2 metres focal length is fixed to the revolving rod,

just on one side of the junction of the revolving rod and the balance beam. The two ends of the revolving rod are made to rest on two fine, well polished and equally levelled glass plates fitted on a stand. One of the cups is filled with a powder containing about 97% Plaster of Paris and 3% CaCl_2 . The mixture of these 2 powders has high power of absorption and desorption of moisture. Suitable wts. are added into the other pan till the beam is almost horizontal. A beam of light is thrown from a lamp and scale arrangement on the spherical mirror and the reflected beam is allowed to fall somewhere in the middle of a vertical scale at a distance of about 200 cm. from the revolving instrument. The whole instrument is placed inside a rectangular glass vessel perforated with holes at the base to permit free circulation of air inside it and to avoid any disturbance to the revolving arrangement due to any direct and strong currents of air. Then the instrument is ready for measurements. With a small change in the humidity of the air, the spot of light moves through a great distance on the vertical scale. The shift of the spot of light is proportional to the change in the relative humidity of the air.—*Auth. abst.*

6284. RUDDER, de. *Medizinische Bioklimatik. Monatsschr. Kinderheilk.* 88: 113-117. 1941.—A review of recent (1938-1939) literature in medical climatology and meteorology.—*Eric Kaufmann.*

6285. THORNTHTWAITE, C. W., C. F. S. SHARPE, and E. F. DOSCH. Climate of the Southwest in relation to accelerated erosion. *Soil Conserv. U. S. Dept. Agric.* 6(11): 298-302, 304. 1941.—The evidence for and against cyclic climatic change in the Southwest is reviewed. Rainfall variations are haphazard. The implications for control of accelerated erosion are outlined.—*Eric Winters.*

6286. WICHT, C. L. (*Forest Dept., Jonkershoek.*) An approach to the study of rainfall interception by forest canopies. *Jour. S. African Forest Assoc.* 6: 54-70. 1 pl., 2 fig. 1941.—The paper deals with the study of the amount of rain intercepted by the leaves, twigs, branches, and stems of trees, and lost to the forest soil mainly through evaporation. A critical account of the history of the investigation of rainfall interception is given. An expt. in a stand of poplars at Jonkershoek is descr. The method of paired stations inside and outside the forest is not entirely satisfactory. Three improvements are suggested: rainfall should be gauged above the canopy as well as in an adjacent open field, all gauges should be sheltered from wind, and the gauging technique used in the forest should be duplicated in the open and above the canopy. The variation in drip and direct penetration under various parts of the canopy was considerable. About 92% of the rainfall in the open, or 32.27 inches, reached the forest floor. Direct penetration and drip through trees in leaf was 79.7%; through bare trees, 82.1%. Stem run-off from trees in leaf was 6.1%; from bare trees, 14.9%. The data indicated that some penetration in the form of drip and stem run-off may have been derived from mist condensation on leaves, twigs, branches, and stems of trees.—*From auth. summ. by W. N. Sparhawk.*

ANIMAL

6287. HUBBARD, DOUGLASS H. The vertebrate animals of Friant reservoir basin with special reference to the possible effects upon them of the Friant Dam. *California Fish and Game* 27(4): 198-215. 5 fig. 1941.—28 days of field study in the basin to be inundated with the completion of the Friant Dam of the Central Valley Water Project, located at the base of the Sierra Nevada foothills, 20 miles n.w. of Fresno, California, on the San Joaquin River, showed the presence of 72 spp. of vertebrate animals—12 reptiles and amphibians, 41 birds and 19 mammals. Other vertebrates are known to be present at other times of the year. Many changes in the vertebrate animal life will be brought about by flooding the area; many animals will be driven from the area by the water, and other spp., especially waterfowl, will be attracted by it. It is doubtful, however, whether the reservoir will be of importance as a feeding ground for waterfowl or whether it will be of importance for game fishing, because the water level will fluctuate as much as 143 feet. It is important, both from the standpoint of scientific information and of practical wildlife management as related to the present and other proposed reclama-

tion projects, that the effects of the new developments on the game and other vertebrates should be carefully followed by qualified field men.—D. H. Hubbard.

6288. MAYR, ERNST. Borders and subdivision of the Polynesian region as based on our knowledge of the distribution of birds. *Proc. 6th Pacific Sci. Congr.* 4: 191-195. 1939.—The Polynesian Subregion is defined as comprising all the tropical and subtropical islands of the Pacific Basin which indicate by their impoverished fauna that they have had no recent continental connection (after early Tertiary), and which derived the major part of their fauna directly or indirectly from the Papuan Region or jointly from Australia and the Papuan Region. Hawaii, Solomon Islands, and New Caledonia are included, but the Galapagos Islands and the New Zealand Region are excluded. This subregion is further subdivided into the following subdivisions on the basis of bird distribution: Micronesia, Central Polynesia, Eastern Polynesia, and Southern Melanesia. It is suggested that this arrangement will be checked when other groups of animals are worked out.—A. C. Hawbecker.

6289. ROGICK, MARY D. (Coll. New Rochelle, New York.) Supplementary note on the effect of the 1938 hurricane. *Ohio Jour. Sci.* 41(6): 453-456. 1 fig. 1941.—During the summer of 1938 collections were made in the Fresh Water Pond at Woods Hole, Mass., and fresh-water Bryozoa (*Fredericella sultana* and *Plumatella* sp.) were found growing there. The hurricane of Sept. 21, 1938 changed the ecological conditions in the pond and as a result brackish water fauna (*Membranipora laceri*, in particular) replaced the fresh-water fauna in the 1939 collections. In the 1940 collection, with which this article deals, only dead remains of Bryozoa are encountered while the other invertebrates are either brackish or fresh-water forms. A sessile statoblast of the *Plumatella* sp. is figured and measurements for it are given. The present salinity of the pond is 3.5%.—M. D. Rogick.

6290. SMITH, H. B. An analysis of the biotic provinces of Mexico, as indicated by the distribution of the lizards of the Genus *Sceloporus*. *An. Escuela Nacion. Cienc. Biol. Méxicol.* 2(1): 95-102. Map. 1940.—The distr. of the lizards of the genus *Sceloporus* is eminently suitable for this study. The knowledge of the taxonomy and distr. of the 101 forms of the genus has been acquired by the study of approx. 19,000 specimens, supplemented by extended field work. At least 2 spp. or subspp. are known from every state and territory of the Republic. Two major geogr. regions enter the boundaries of Mexico: the Nearctic region includes the coasts southward approx. to the Tropic of Cancer, the plateau and adjacent mountain ranges, and Lower California; the Neotropical region extends nearly to Mazatlan, on the Pacific shore, and up the Balsas river basin to southern Puebla, on the east, extending well north of Tampico, almost exactly to the Tropic of Cancer. Two of the generally recognized subregions of the Nearctic occur in Mexico, the Rocky Mt. and the Californian. The Californian subregion enters Mexico only in extreme northwestern Lower California. The Neotropical part of Mexico falls entirely within the Mexican subregion. 84 forms of *Sceloporus* occur in Mexico; 59 of these are confined to the Nearctic region, and 20 to the Neotropical. The 5 which occur in both regions appear to be essentially neotropical; 2 of these enter the Nearctic region through the Balsas basin, 2 over the mountain range south of Lake Chapala, and 1 over the middle of the Isthmus of Tehuantepec. The regions, subregions and provinces are outlined as follows: I.—Nearctic region. A). Rocky Mt. subregion including the provinces (1) Oaxacan Highland, (2) Guerreran, with 2 sections Eastern and Western, (3) Upper Balsan, (4) Austro-Central, (5) Austro-occidental with 3 sections: Western, Central and Eastern, (6) Austro-oriental, (7) Hidalgan, (8) Chihuahuan with Western, Central and Eastern sections, (9) Sinaloan, (10) Taumalipan, (11) Arizonean, (12) Apachian, (13) Durangan, (14) Peninsular and (15) Cape province. B). Californian subregion with the 16. San Diegan province. II.—The Neotropical region, with the Mexican subregion and the following provinces: (17) Chiapan plateau, (18) Tapachulan with Northern and Southern sections, (19) Peten, (20) Yucatecan, (21) Veracruz, (22) Tehuantepecan and (23) Lower Balsan. The author makes 3 changes in his earlier scheme (1939). Two

or 3 subdivisions of each of 4 provinces are pointed out; another province (Hidalgan) is defined; and provinces of Lower California equivalent to mainland Mexican provinces are proposed.—B. F. Osorio Tafall.

6291. SPROSTON, N. G., and P. H. T. HARTLEY. (*Plymouth Lab.*) The ecology of some parasitic copepods of gadoids and other fishes. *Jour. Marine Biol. Assoc. United Kingdom* 25(2): 361-392. 1941.—The variations in the incidence of infection of *Gadus merlangus* and *G. pollachius* with *Lernaeocera branchialis* were examined in relation to their migratory habits in the estuarine, inshore and offshore waters near Plymouth. A sudden increase in infection of fish from estuarine and inshore waters follows the offshore migration of the main stock. The offshore migrants are probably not infected. The lingering behind of infected fish and the infection of the young stock after they come inshore is correlated with the high rate of infection of *Pleuronectes flesus*—the host of the larval stages and ♂♂—in the mouth of estuaries. *L. lusci* however is far more common on the *G. luscus* from offshore waters and probably has a different intermediate host. Sprats infected with *Lernaeicinus* spp. also linger inshore with the stock of the following yr. Time relations of the phases of the life cycle of *L. branchialis* were examined; breeding is continuous. The distribution of *Clavella uncinata* does not show the same relation to the migration of the host, and probably the most important limiting factor is salinity. Breeding is also continuous in this sp.; and in both parasites multiple infections are common, so that no immunity is developed by the host. Salinity and other factors influence the distribution of some caligid parasites of ecologically related fishes.—N. G. Sproston.

6292. SVIHLA, ARTHUR. (U. Washington.) The relation of water to dormancy in mammals. *Murrelet* 22(1): 15-18. 1941.—In Jan. and Feb. several hibernating *Zapus t. trinotatus* and aestivo-hibernating *Citellus t. townsendii*, captives since the previous spring, were inj'd. peritoneally with $\frac{1}{2}$ -1 $\frac{1}{2}$ cc. of solns. of HCl, salt, and dist. and tap water, all at sub-body temps. As a control measure, 1 squirrel and 3 mice were pricked but not inj'd. In each case when an aqueous soln. was inj'd., regardless of composition, the animal became active in a few hrs., and remained so for periods of 1-8 days (latter fig. not given in all cases). 3 of the specimens merely pricked did not awaken; 1 mouse awoke but was only sluggishly active for 2 $\frac{1}{2}$ hrs. before returning to hibernation. These data are compared with those of Adler, who used aqueous solns. of endocrine substances, and of Zondek, who used aq. salt solns., the solns. in each case higher in temp. than the bodies of the animals inj'd. It is concluded that water is probably the activating agent involved in all these expts.—J. W. Shipp.

PLANT

6293. DORR, MARIA. (U. Vienna.) Temperaturnessungen an Pflanzen des Frauensteins bei Mödling. *Beih. Bot. Centralbl. Abt. A* 60(3): 679-728. 17 fig. 1941.—This investigation was carried out in the summer of 1935 mainly with xeric plants on s.e. slopes of the Frauenstein. The following plants were studied: *Onosma visianii*, *Globularia cordifolia*, *Helianthemum canum*, *Potentilla arenaria*, *Teucrium chamaedrys*, *Fumana procumbens*, *Aster linosyris*, *Dorycnium germanicum*, *Bupleurum falcatum*, *Sanguisorba minor*, *Sempervivum hirtum* and for comparison also *Cynanchum vincetoxicum* and *Hieracium pilosella*. In full sunshine the different plants have different leaf temps., at times running in a definite range, which is detd. by structural peculiarities (e.g., pubescence) and by different transpiration intensities. E.g., leaves of *Globularia*, *Hieracium*, *Potentilla* and *Teucrium* were 10-15° warmer than the surrounding air, leaves of *Bupleurum*, *Cynanchum*, *Dorycnium*, *Fumana* and *Aster* scarcely 5° warmer than air, and leaves of *Sanguisorba* 5-8° warmer than air. The highest tissue temps. measured under full insolation were 50.2° in *Sempervivum hirtum* and 48.7° in *Globularia*. The tissue temps. of leaves decrease with a reduction in radiation intensity. Non-insolated leaves are often several degrees warmer than the surrounding air. Yet leaf temps. were observed also which were less than the temp. of the air layers near the plants: in *Aster* and *Synanchum* mostly in connection with optimal water supply (after heavy rainfall), maximal transpiration or rather

strong gusts of wind. Artificially shaded leaves of *Helianthemum*, *Globularia* and *Potentilla* remained prevailingly warmer than the surrounding air. Hereby attention is to be given particularly to the degree of penetrability by radiation of the material used for shading. The effect of heat exchange and thermic inertia on the temp. of the plant tissues becomes evident with the cooling of the leaves by artificial shading and with their rewarthing as a result of renewed action of solar radiation whereby a difference in the rapidity of the attainment of a condition of equilibrium can be observed according to the structural nature of the leaves and their temp. difference from that of the air. The difference in the absorption of radiation by bodies of different color results in the following series of increasing leaf temps. (constant radiation assumed): (air), yellow, green, orange, red leaves. The strong absorption of red leaves causes a rapid absorption and emission of heat. Its position with reference to the incident light and heat radiation (angle of incidence) is decisive for the temp. of the leaf. Tilting of the leaves to the incidence of radiation results in lower temps. The effect of the angle of incidence can be clearly followed by measurements on leaves which were turned parallel or perpendicular to the incidence of radiation. Leaves brought to a horizontal position were always warmer by several degrees (3.4-5.1°) than those placed nearly parallel to the incidence of radiation or hanging down obliquely. Leaves of *Teucrium* and *Potentilla* placed perpendicular to the incidence of radiation were found to be 3° warmer on the average than comparison leaves remaining in their natural position. The course of the temp. in leaves during the day is correlated with the height of the sun; also the highest leaf temp. reached depends upon the midday height of the sun. Because of the position of the sun in Sept., lower by 20° as compared with July, a leaf under otherwise comparable conditions only reaches a temp. about 10° lower than the July value. Wind cools the leaf tissues (directly by carrying away heat and by increasing transpiration) which is manifest especially in the temp. course in gusty weather. Yet the effect of the wind, which concerns the cooling of the plant tissues in comparison with the surrounding air, is less significant than the absence of insolation. In general increasing wind velocity causes greater transpiration. After a long duration of strong wind or beyond a certain wind velocity a reduction in transpiration and closing of the stomata occurs. Transpiration increases with rising temp. yet generally it undergoes a reduction on reaching or exceeding a certain temp. Wilting leaves are always warmer by several degrees than fresh ones. The psychrometer difference, which by way of comparison was used to determine the behavior of fresh and wilting leaves, in general was not equalled by the temp. difference between fully transpiring fresh and wilting leaves. Measurements in the root collar of most of the exptl. plants showed that these as well as all plant organs in contact with the soil were affected markedly by the high temp. of the surface of the soil; yet the individual plant spp. differed from one another because of structural peculiarities and different water conduction. The temp. in the root collar of *Onosma* in dry weather is always lower, of *Globularia*, *Hieracium*, *Helianthemum* and *Aster* always higher than that of the surrounding soil. Shortly after heavy rain the high water content of the soil and the increased water conduction in the root collar show their effect in its temp. In *Onosma* the base of the leaf warms up more than the apex, but in the afternoon cools off more rapidly than the latter. Herbaceous stems, especially woody ones, are, at the maximum, up to 12° warmer than leaves observed at the same time. The temps. of roots, at different depths of the soil, show the closest agreement with the temp. of the surrounding soil at the time.—Auth. summ. (tr. by H. F. Bergman).

6294. EYLES, DON E. (U. S. Publ. Health Serv.) A phytosociological study of the *Castalia*-*Myriophyllum* community of Georgia coastal plain boggy ponds. *Amer. Midland Nat.* 26(2): 421-438. 1941.—The vegetation of 5 shallow, boggy ponds of soln. origin of the Georgia coastal plain is descr., from 20 meter-square quadrats placed along spaced lines across each stand. The greater portion of these ponds was found to be covered by a single layered growth with *Castalia odorata* and *Myriophyllum pinnatum* dominant. Abundance-cover and frequency data were tabulated

from the quadrats and the community was found to possess about 20 spp. mostly of high frequency in individual stands and of high constancy in the 5 stands studied. The species-area curve for each stand was found to fit the equation for a hyperbolic curve and the minimal area was detd. mathematically to be between 4.4 and 8.5 sq. m. Certain characteristics of the peaty substratum were measured, and other ecological observations made. *Myriophyllum pinnatum*, *Nymphoides aquatum*, *Eleocharis robbinsi*, and *E. equisetoides* might be considered as characteristic spp. at least as concerns the region studied.—D. E. Eyles.

6295. GATES, WILLIAM H. (Louisiana State U.) Observations on the possible origin of the balds of the Southern Appalachians. 16p. 4 fig. Louisiana State Univ. Press: Baton Rouge, 1941.—A report on a series of attacks by the Oak-twig gall wasp, *Andricus gemmarius*, on the red oaks, *Quercus borealis*. The severity of these attacks may easily account for the absence of oaks on the peaks above 4,500 ft. where the climax is oak-grass. A concentrated attack such as reported probably does not occur more often than once in a hundred years, and may not always be on the same peak. At this altitude the life cycle of the wasp is 3 yrs. The wasp seems to be extremely specific for altitude. This seems to be the only satisfactory explanation offered for the bald peaks of this region.—W. H. Gates.

6296. GONGGRIJP, L. De verdamping van het gebergtebosch in West-Java op 1750-2000 m. zeehoogte. [Transpiration of mountain forest in W. Java at 1750-2000 m. altitude.] [With Eng. summ.] *Tectona* 34(7): 437-447. Map, 2 fig. 1941.—Observations for 1-6 yrs. on 9 small river basins in the mountains s. of Bandoeeng indicate that total transpiration and evaporation amount to about 1250 mm. a yr., or about 40% of the annual rainfall.—W. N. Sparhawk.

6297. KOTOV, M. I. (Vegetation of the steep slopes and rock outcrops in the Donets Ridge and their application in farming and forestry.) [With Eng. summ.] *Zhurnal Inst. Bot. Vuan (Jour. Inst. Bot. Acad. Sci. Ukraine)* 31: 27-47. 1940.—Steep slopes and rock outcrops occupy a large area in the Donets Ridge. The land is abandoned and used only for pasture. The struggle against erosion is one of the chief problems for farming in the Donbas. The chief protection against erosion is the planting of forests and reenforcing the slopes with perennial food grasses. By means of terraces the slopes may be covered with soil-protecting plants, preferably legumes, and various technical crops can be grown including ether-oil plants, various fibre plants including flax, and rubber-bearing plants such as *Scorzonera*. The slopes may also be used for the cultivation of fruit trees and shrubs, grapes, and possibly tobacco.—From. Eng. summ. by Freeman Weiss.

6298. PECHANEC, JOSEPH F., and GEORGE STEWART. (U. S. Sheep Exp. Sta., Dubois, Idaho.) Sagebrush-grass range sampling studies: variability of native vegetation and sampling error. *Jour. Amer. Soc. Agron.* 33(12): 1057-1071. 1941.—Variability of native sagebrush-grass range vegetation was studied at the U. S. Sheep Expt. Station near Dubois, Idaho. The sagebrush-grass type is a heterogeneous plant community, composed of spp. that are highly variable in abundance and whose frequency distributions are strongly skewed to the left. Subdivided random sampling, using line-plot sampling units, is as easily used as systematic sampling and increased the information secured by 1.31, 0.61, and 1.08 units, respectively, for the 3 major plant spp., over the information that might have been secured with strictly random sampling. To provide data reliable enough for studies of plant succession, indicator spp., or poisonous plants, sampling intensity should be detd. with full cognizance of the higher variability of secondary spp. No acceptable standard of accuracy can be set for sampling but certain intensive vegetation studies may require sampling sufficiently intense to provide a sampling error of 5% for the major spp. and class totals and 10% for secondary spp.—J. F. Pechanec.

6299. PENLAND, C. WILLIAM T. The alpine vegetation of the southern Rockies and the Ecuadorean Andes. *Colorado Coll. Publ. Gen. Ser.* 230. 5-30. 6 fig. 1941.—Floristic relations between the alpine zone of the temperate Southern Rocky Mts., the corresponding páramo zone of the tropical Ecuadorean Andes, and the Arctic tundra are considered to result from a resemblance of habitats and a

derivation of floras by migration from specific centers. Species of small range are found to be both youthful (locally derived) and relictual. Mountain elements have contributed to the Arctic flora, but the bulk of the arctic-alpine plants seem to have had their origin in the north. Wide disjunctions are considered to have been derived from once more continuous ranges and not from long-distance dispersal, although polytopic origin is not considered impossible. Extreme and fluctuating environmental factors are considered important in alpine speciation. The rarity of many alpine spp. is attributed to the vicissitudes of climatic fluctuations, especially during the Pleistocene, and the scattered nature of many specific habitats. The páramo is described as to life-form and floristic content in higher categories. Bunch grasses are dominant and cushion shrubs important. 19 of the 25 Colorado tundra families are present in the páramo, and the latter contains in addition 22 families more (Bromeliaceae, etc.). There is, however, an impressive array of northern genera in the páramo (*Gentiana*, *Ranunculus*, *Caltha*, etc.). Identity of species in the 2 regions is practically absent.—S. A. Cain.

OCEANOGRAPHY

(See also B. A. 16(2): Entries 3487, 3834; and in this issue 8352, 8374, 8379)

6300. FOX, DENIS L., and LLOYD J. ANDERSON. (*Scripps Inst. Oceanogr., La Jolla, Calif.*) Pigments from marine muds. *Proc. Nation. Acad. Sci. U. S. A.* 27(7): 333-337. 1941.—Extraction of mud cores from the middle of the Gulf of California revealed numerous chlorophyll derivatives and carotenoids. This leads to speculation that protochlorophyll and other degradation products may have been wrought by non-chlorophyllous organisms; and that the rich deposits of numerous carotenoids may indicate an excess of fungal and bacterial over algal remains, or that isomerization and other chemical changes have taken place without biol. intervention.—R. A. Muttikowski.

6301. HARVEY, H. W. (*Plymouth Lab.*) On changes taking place in sea water during storage. *Jour. Marine Biol. Assoc. United Kingdom* 25(2): 225-233. 1941.—The rapid growth of bacteria when sea water is stored in glass vessels, and the possibility that this is due to conc. of food by adsorption on the glass-water interface, is reviewed. Exptl. evidence of such adsorption is presented. Observations bearing upon the regeneration of phosphates from dissolved organic P compounds in the sea are reviewed.—H. W. Harvey.

6302. PARR, ALBERT EIDE. Further observations on the hydrography of the Eastern Caribbean and adjacent Atlantic waters. *Bull. Bingham Oceanogr. Coll. Peabody Mus. Nat. Hist. Yale Univ.* 6(4): 1-29. 22 fig. 1938.

6303. SMITH, C. L. (*Bahamas Sponge Fish. Invest. Dept.*) The solubility of calcium carbonate in tropical sea water. *Jour. Marine Biol. Assoc. United Kingdom* 25(2): 235-242. 1941.—Sea water from the Great Bahama Bank was shaken, in sealed bottles, with samples of the natural calcareous bottom deposit. The value of the ionic product, $\text{Ca}^{++} \times \text{CO}_3^-$, was calculated from analytical observations made after varying periods of shaking at constant temp. A new value of 1.16×10^{-6} is put forward as representing the solubility product constant, ($K' \text{CaCO}_3$), of CaCO_3 in sea water at 30°C and 36°S . This value compares favorably with observations previously made by the author on sea water from the Great Bahama Bank, where CaCO_3 precipitation is taking place under natural conditions.—C. L. Smith.

6304. WATKIN, E. EMRY. (*U. Coll. Wales.*) Observations on the night tidal migrant Crustacea of Kames Bay. *Jour. Mar. Biol. Assoc. United Kingdom* 25(1): 81-96. 1941.—The faunal analysis of 48 samples taken with a coarse tow-net across the intertidal waters of Kames Bay during 1936 shows that the night-migrant crustacean population falls into 2 well marked groups: (a) spp. which live in the intertidal sand and perform simple vertical migrations at night time into the intertidal waters, and (b) those which are carried in by the tide into the intertidal area from various habitats which lie beyond the low-water mark of spring tides. In the former group the species of the genera *Bathyporeia* and *Pontocrates* are dominant and they retain their zonation as migrants, the population consisting of individuals in all stages of maturity. This is in sharp con-

trast to the latter group, typified by *Gammarus locusta* and *Idotea viridis*, which occur over the whole tidal range with a population in which the young immature stages are dominant. A discussion of the results suggests some of the possible factors determining the migration and indicates the lines along which further investigations may be carried out.—E. E. Watkin.

LIMNOLOGY

(See also B. A. 16 (1): Entries 1877, 2175, 2761; (2): 3834, 4838, 4851, 5028, 5714, 5845; and in this issue 6133, 6332, 7494)

6305. ALLGEIER, R. J., B. C. HAFFORD, and C. JUDAY. Oxidation-reduction potentials and pH of lake waters and of lake sediments. *Trans. Wisconsin Acad. Sci., Arts and Lett.* 33: 115-133. 1941.—Apparatus is described for the determination of oxidation-reduction potentials and pH simultaneously in situ in lake waters. The Eh' values in the various lakes ranged from a maximum of +512 mv. in the upper water of one lake to a minimum of +77 mv. in the bottom water of another. The lowest potential for bottom mud was -140 mv. Dissolved O₂ was not the only factor involved in reducing the oxidation-reduction potential of the lower water; ferrous iron and H₂S played a part, and probably organic reducing systems also. In the oligotrophic lakes, the oxidation-reduction potential was substantially the same at all depths, or showed only a small decrease in the lower water; there were marked decreases in the lower water of eutrophic and dystrophic lakes. Considerable changes in redox potentials were found in 7 lakes on which observations were made about a month apart.—Chancey Juday.

6306. BARNES, H. A note on the determination of very small quantities of hydroxylamine by Blom's method. *Jour. Marine Biol. Assoc. United Kingdom* 25(1): 109-110. 1941.—Possible sources of error are indicated when the method is applied to very low concs.—H. Barnes.

6307. BROUGHTON, W. A. The geology, ground water and lake basin seal of the region south of the Muskeleunge moraine, Vilas County, Wisconsin. *Trans. Wisconsin Acad. Sci., Arts and Lett.* 33: 5-20. 1941.—Lakes in this region are of 3 types, bog, seepage (those without inlets or outlets), and drainage. Bog lakes have the softest water and drainage lakes the hardest, with seepage lakes intermediate in hardness. The carbonates in the water come chiefly from buried calcareous drift. Surface streams accumulate the ground water, and act as collecting and carrying agents for the carbonates, adding them to the waters of the drainage lakes. There is no similarity between the carbonate content of the lake waters and the surrounding ground water. The lakes have effectively sealed off their basins from the influence of the ground water by depositing clays and organic muds over the bottoms of the basins. In general the harder waters are more productive than the soft ones.—Chancey Juday.

6308. DAVIS, FRANCIS J. Surface loss of solar and sky radiation by inland lakes. *Trans. Wisconsin Acad. Sci., Arts and Lett.* 33: 83-93. 1941.—Surface loss is due to reflection and to upward scattering out of the water by suspensoids. It varies with the elevation of the sun, and the condition of the sky and of the surface of the water. It was substantially the same for smooth and rough surface down to a zenith angle of 50° , but at greater angles the loss was greater from a smooth than from a rough surface. The loss for a diffuse sky was 6%, but for a clear sky it was 5.2% in July and 5.5% in mid-Aug. The % loss for red light was < that for total light down to zenith angles of 60° to 70° ; at greater angles red light showed a greater % surface loss than total light.—Auth. summ.

6309. DOAN, KENNETH H. (*Ohio State U.*) Relation of sauger catch to turbidity in Lake Erie. *Ohio Jour. Sci.* 41(6): 449-452. 1941.—A significant degree of correlation ($r = +0.79$) has existed from 1927 to 1936 between the mean April-May turbidity of Lake Erie at Cleveland and the total Ohio commercial catch of *Stizostedion canadense* 3 yrs. later. There is a statistically significant r of +0.60 between the mean Apr.-May precipitation at Toledo, Sandusky and Cleveland and the mean Apr.-May turbidity of L. Erie at Cleveland, from 1927 to 1938. Higher turbidities may act to prevent stickiness in sauger eggs, give young fry pro-

tection from predators, and facilitate the young saugers' feeding by concentrating plankton organisms near the surface; results of increased fry production would be evident in the catch 3 yrs. later.—K. H. Doan.

6310. HARDMAN, YVETTE. The surface tension of Wisconsin lake waters. *Trans. Wisconsin Acad. Sci., Arts and Lett.* 33: 395-404. 1941.—Physical, chemical and biological factors were involved in lowering the surface tension of the lake waters investigated. Temp., wind action, mechanical agitation such as water flowing over a dam, tended to lower the surface tension. Hardness of the water, within certain limits, did not affect surface tension, nor did variations in pH ranging from 4.5 to 8.5; colored waters of bog lakes usually have a lower tension, ranging from normal, which is 72 dynes, to a minimum of 50 dynes/cm. Biol. factors that served as depressants were large crops of phytoplankton and higher aquatic plants, especially those with floating leaves. The relation of surface tension to the organisms that live on the water surface or just under it is discussed.—*Chancey Juday*.

6311. JAMES, HARRY R. Beer's law and the properties of organic matter in lake waters. *Trans. Wisconsin Acad. Sci., Arts and Lett.* 33: 73-82. 1941.—A fairly close agreement with the law was found for dilutions containing 5% or more of lake water, but much irregularity was noted in light absorption in dilutions with < 5%. This indicates that the physical state of the organic colloids (chiefly vegetable extracts) is altered by changes in pH or other physical conditions in the more dilute solns.—*Chancey Juday*.

6312. JÖRG, M. E. Longitudinal scattering of light (Plotnikov effect) and its importance in biology. *Fundamenta Radiologica* 4: 9-17. Also in *Analyst* 64: 849-851. 1939.—The magnitude of the Plotnikov effect depends on, and may be used to indicate the nature of, the mol. state of the substance producing it, and details are given of 2 applications of this nature, in which the scattering of the wave lengths, 318, 375 to 400, 450, 519 to 590 and 740 to 1000 m μ was measured. Water taken from the surface of the Sargasso Sea was tested after filtration through filter paper, after 4 subsequent ultrafiltrations through a Bechhold collodion-cellulose acetate filter, after boiling followed by a 5th ultrafiltration and after distillation. After the 1st ultrafiltration 0.4% of organic matter was present; none was detectable after the 5th ultrafiltration. The results indicated a considerable scattering capacity throughout the whole spectral range after simple filtration, but especially with u-v. After the 1st ultrafiltration the scattering was less, especially for the u-v., and the 3 following ultrafiltrations resulted in further rapid decreases, except for the infrared range; the diams. of the aurora falling in this instance only 15.32 to 15.2 mm. After boiling and the 5th ultrafiltration, the scattering of the infrared rays was reduced to 15.18 mm., and, except for a slight scattering of green rays (8.2 mm.), no Plotnikov effect was apparent with the other regions of the spectrum tested. After distn. there remained only a slight scattering (9.5 mm.) of the infrared rays. Photographs of the corresponding aurora are reproduced. When dust-free water was distd. 3 times in a vacuum, a similar result was obtained (i.e., a scattering of diam. 8.18 mm. in the infrared region only, which is known as the "limiting dispersion"). Evidently the characteristic color, viscosity and phys. properties of the Sargasso Sea water are due to organic substances of high mol. wts., which cannot be removed completely by successive ultrafiltrations.—Similar expts. were made with a synthetic resin, prep'd. from urea, glycerol and an aliphatic aldehyde, in the fluid, viscous and solid states: in none of these was there scattering of the u-v., violet or blue rays; scattering of the green rays was very weak (9.23 mm.), and very weak for the 3 states, resp.; scattering of infrared rays corresponded with auroras of diams. 9.2, 12.3 and 9.2 mm., resp. These results confirm the view that in the 1st stage, when the resin is fluid and optically-clear, long-chain mols. have only started to form by polymerization, and that this process is completed in the 2d stage; the 3d (i.e., hardening) stage corresponds with the formation of cyclic compds. from these mol. chains.—*Chem. Abst.*

6313. JUDAY, C., and E. A. BIRGE. Hydrography and morphometry of some northeastern Wisconsin lakes. *Trans. Wisconsin Acad. Sci., Arts and Lett.* 33: 21-72. 1941.—Hydro-

graphic maps of 34 lakes are shown, together with data on their area, depth, volume and chemical characteristics of their waters.—*Chancey Juday*.

6314. JUDAY, C., E. A. BIRGE, and V. W. MELOCHE. Chemical analyses of the bottom deposits of Wisconsin lakes. II. Second report. *Trans. Wisconsin Acad. Sci., Arts and Lett.* 33: 99-114. 1941.—Quantitative results of the chemical analyses of the bottom deposits of 21 lakes are given; they include 6 mineral and 3 organic constituents. The latter are org. C, org. N, and ether extract or fat.—*Chancey Juday*.

6315. MANNING, WINSTON M., and RICHARD E. JUDAY. The chlorophyll content and productivity of some lakes in northeastern Wisconsin. *Trans. Wisconsin Acad. Sci., Arts and Lett.* 33: 363-393. 1941.—Observations were made on the conc. and distribution of chlorophyll in several lakes during July and Aug. In some of the lakes the vertical distribution of the chlorophyll remained fairly constant; in others there were marked changes in the type of depth distribution. Within certain limitations, chlorophyll may be used as an index of the photosynthetic capacity of the water in the epilimnion. At optimal light intensity, the av. capacity was 7 mg. O₂ produced per mg. of chlorophyll per hr. This corresponds to a reduction of 1 molecule of CO₂ by 1 molecule of chlorophyll every 18 sec. The highest productivity on a clear day in early Aug. was 44 kg. of glucose per ha./day, while the lowest value found was 14 kg./ha./day.—*Chancey Juday*.

6316. ROLL, HARTWIG. (Kaiser Wilhelm Inst.) Wege und Ziele der Potamobotanik. *Chron. Bot.* 6(13): 289-292. 1941.—Potamobotany is a branch of science derived from plant sociology, limnology, geology, etc.—*L. J. Gier*.

6317. SANFORD, K. K., and A. M. BANTA. (Brown U., Providence, Rhode Island.) A temperature effect on the grade of intersexuality in *Daphnia longispina*. *Genetics* 26(1): 166. 1941.—An abstract.

6318. SMITH, L. V. *Labidocera glauca* (Sp. Nov.). A blue copepod of Puerto Galera Bay, Mindoro. *Philippine Jour. Sci.* 75(3): 307-321. 1 pl., 6 fig. 1941.—*Labidocera glauca* is descr. Part 2 deals with a determination of the vertical migration of these copepods at Puerto Galera Bay. They are negatively phototropic as they are most abundant after dark. The maximum hauls usually can be taken just after sunset and just before sunrise. More ♂ than ♀ come to the surface during these migrations. As for the other plankton collected with the *L. glauca*, there seems to be no relation between it and the time of day collected or between the amt. of plankton and number of *L. glauca*.—*L. V. Smith*.

6319. WHITNEY, L. V. A multiple electromagnetic water sampler. *Trans. Wisconsin Acad. Sci., Arts and Lett.* 33: 95-97. 1941.—An instrument designed to take 6 water samples at different depths for bacteriological studies without bringing the apparatus to the surface.—*Chancey Juday*.

6320. WILSON, L. R. The larger aquatic vegetation of Trout Lake, Vilas County, Wisconsin. *Trans. Wisconsin Acad. Sci., Arts and Lett.* 33: 135-146. 1941.—This is a medium hard water, oligotrophic lake. The larger aquatic vegetation consisted of 38 spp. which occupy the lake soils to a depth of 6.5 m. The total crop in this zone was small, amounting to only about 748 g. per ha. in the colonized zone. 61% of the crop was restricted to the 0-1 m. zone, 23% to the 1-3 m. zone, and 16% to the 3-6.5 m. zone. In their light relationships, some spp. did not grow where the illumination was less than 70% of full sunlight, while others grew where there was as little as 2%.—*Chancey Juday*.

WILDLIFE MANAGEMENT—AQUATIC
(See also Entries 6289, 6291, 6309, 6350, 6518, 6920, 7536, 7540, 7570, 7644, 8153, 8360, 8370, 8375)

6321. ARRIOLA, FELIX J. (Dept. Agric. and Comm., Manila.) A preliminary study of the life history of *Scylla serrata* (Forskal). *Philippine Jour. Sci.* 73(4): 437-456. 3 pl., 1 fig. 1940.—The alimango is the most important commercial crab in the Philippines. A detailed account is given of the habits, spawning characteristics, migration, and cultivation in captivity. Growth is accomplished when this crab molts. The crab molts from 12 to 15 times within a period of approx. 186 days.—*C. H. Meredith*.

6322. BREWER, LEIGHTON. Virgin water. Thirty-five years in quest of the Squaretail Trout. Photographs by HELEN H. BREWER. 223p. Frontispiece, 31 pl. Coward-McCann, Inc.: New York, 1941. Pr. \$2.50.—This is an account of the practical experiences of an expert fisherman with the brook trout, *Salvelinus fontinalis*, in Adirondack and Canadian waters. It contains the observations of an experienced observer on the reactions and behavior of this fish under various conditions in different environments. It also describes his methods and results in stocking local waters.—C. A. Kofoid.

6323. FOERSTER, R. E., and A. L. PRITCHARD. Observations on the relation of egg content to total length and weight in the sockeye salmon (*Oncorhynchus nerka*) and the pink salmon (*O. gorbuscha*). *Trans. Roy. Soc. Canada Sect. 5* 35: 51-60. 1941.—In any given year for sockeye salmon migrating to spawn in Cultus Lake, British Columbia, and for pink salmon running to McClinton Creek, Queen Charlotte Islands, there is a significant positive correlation between the number of eggs contained in the ovaries and each of (1) the total length, and (2) the wt. of the individuals. When a linear correlation is assumed, the relationship as indicated by the equation of the lines of regression of eggs on length and eggs on wt. varies from yr. to yr. The averages for the individual yrs., when plotted, show a similar trend of increase in number of eggs with rise in length and wt. All the observations for each spp. have been combined to indicate the general relationship.—Authors.

6324. FREY, DAVID G., and LAWRENCE VIKE. A creek census on lakes Waubesa and Kegonsa, Wisconsin, in 1939. *Trans. Wisconsin Acad. Sci., Arts and Lett.* 33: 339-362. 1941.—Approx. 40,000 fish were caught in Lake Waubesa and 12,000 in L. Kegonsa during the 1939 fishing season. 93% of the fish caught in Waubesa were black crappies and 57% of those from Kegonsa were white bass. A large hatch of carp in 1936 stimulated an increase in the crappie and white bass populations of their respective lakes. Competition for food among the white bass of Kegonsa was so keen after 1936 that the 1931 year class did not grow in length during 1937 and 1938, hence they did not form an anulus on their scales during these two years.—Chancey Judy.

6325. GWYN, AGNES M. (U. British Columbia.) The development of the vertebral column of the Pacific herring (*Clupea pallasi*). *Jour. Fish. Res. Bd. Canada* 5(1): 11-22. 5 fig. 1940.—Embryological development is followed over a period of 10 weeks after hatching. The mode of formation of the components of the vertebral column is compared with that in *Clupea harengus*, and is described in detail where differences are observed or additional information is available. Development appears essentially similar in the 2 species, although in general more rapid relative to length in *C. pallasi*. At hatching, myotome formation is complete and the ultimate vertebral number of an individual is presumably determined by that time. During ossification of the vertebral column, complex growth gradients from one or more centres are observed.—Auth. abstr.

6326. HART, J. S. Report of a season's angling, Cache Lake and neighbouring lakes, summer 1938. 9p. University of Toronto: Toronto, 1939.

6327. HART, J. S., and F. E. J. FRY. The bass fishery of Cache Lake, Algonquin Park, Ontario. 8p. University of Toronto: Toronto, 1941.

6328. HILE, RALPH, and C. JUDAY. Bathymetric distribution of fish in lakes of northeastern highlands, Wisconsin. *Trans. Wisconsin Acad. Sci., Arts and Lett.* 33: 147-187. 1941.—This paper is based on fish taken in gill nets of 7 different mesh sizes in 5 lakes during the summers of 1930-32. The depth of water inhabited by a single sp. of fish varied widely in these lakes; also the relationship between size of fish and depth of water inhabited varied from lake to lake. Different spp. that lived at the same depth in one inhabited different depths in another. The variations in bathymetric distribution from lake to lake showed no clear-cut dependence on differences in temp., or on amt. of O₂ or CO₂. Rock bass of all sizes preferred the warm waters of the epilimnion in 3 lakes, but in another the larger sizes were found in the upper part of the thermocline, or 2 to 4 m.

below the smaller sizes. In 3 of the lakes the perch inhabited chiefly the 3-5 m. stratum, but in another the small perch showed a marked preference for the deeper, colder strata. In 2 lakes suckers were most abundant in the lower part of the epilimnion and the upper part of the thermocline; in a 3d lake they were taken down to 7 m. The smallmouth black bass was found regularly in shallow water.—Chancey Judy.

6329. HILE, RALPH. Age and growth of the rock bass, *Ambloplites rupestris* (Rafinesque), in Nebish Lake, Wisconsin. *Trans. Wisconsin Acad. Sci., Arts and Lett.* 33: 189-337. 1941.—This paper is based on data obtained from 1453 rock bass, of which age and growth studies were made on 1215 specimens. The growth and strength of the year classes were subject to wide fluctuations. In general strong year classes occurred in years of good growth and weak year classes in years of poor growth. Growth during the 1st yr., however, was not correlated with the growth in later yrs. or with fluctuations in the strength of the yr. classes. The annual fluctuations in growth in the 2d and later yrs. of life and the strength of the yr. classes showed a correlation with temp. and precipitation. Good growth was correlated positively with high temps., especially in June and Sept. The greater part of the season's growth was completed by late July or early Aug.; the older rock bass had completed a smaller % of their growth by this date than the younger ones, and ♂♂ had completed a smaller % than ♀♀. The superior late season growth of the ♂♂ accounted for the more rapid growth of that sex. The relationship between the length at the end of the 1st year of life and growth in later years was subject to considerable variation. First-yr. advantage in size may be retained over 1 or 2 additional yrs., but more probably it will be increased in the 2d or 3d year of life. Compensatory growth was found in the later yrs. Males and ♀♀ reach sexual maturity at approx. the same age, but this may vary from the 4th to the 7th yr. of life. The mature individuals of an age group were generally somewhat longer than immature fish of the same age. Females were more abundant than ♂♂ in each year's collection. The relative abundance of ♀♀ increased irregularly with increase in age, thus indicating a differential mortality of the sexes.—Chancey Judy.

6330. HOCKS, B. M. Oorzaken van de styging van de vish productie in het Tempe-meer (zuid Celebes). [Causes of increased fish production in Tempi lake (s. Celebes).] *Landbouw* 17(1): 1-9. 1941.—Several shallow lakes in the south of Celebes are characterized by an abundance of vegetable fish food, especially plankton which was not used by the local fish fauna. For that reason 2 additional spp. of fish—the plankton eaters *Trichogaster pectoralis* and *Puntius javanicus*—were imported from Java in 1937. The planting of these fishes has been successful and resulted in an enlarged fishing industry. Investigations are still being made by the biol., economic and technical service of the Bureau of Freshwater Fisheries to study the favorite food and spawning places and the further economic possibilities of the lakes.—T. P. Dykstra.

6331. RICKER, W. E. (Indiana U.) Relation of "catch per unit effort" to abundance and rate of exploitation. *Jour. Fish. Res. Bd. Canada* 5(1): 43-70. 3 fig. 1940.—Two extreme types of fisheries are set up for analysis. In type I natural mortality and recruitment are negligible while fishing is in progress; in type II natural mortality, recruitment and fishing mortality all occur throughout the year at a uniform rate. With either type, the catch per unit effort is proportional to the average population on hand while fishing is in progress. This statistic is less useful than it may appear, because, in cases of type I, recruitment occurs between the fishing seasons, and in cases of II, the slow process of removal (or replacement) of accumulated stock following a change in fishing effort makes it difficult to determine the significance of any change in catch per unit effort. A more useful statistic is the rate of exploitation (a fish's annual expectation of death by capture). A theoretical relationship between rate of exploitation and gear in use is here developed for type I fisheries, and is shown to apply fairly well to many cases of type II—so that if rate of exploitation for 1 yr. be determined, that for other yrs. can be calculated. For certain special cases

of type I fisheries, several methods are proposed by which rate of exploitation might be estimated from ordinary statistics of catch and effort. For other cases of type I, and all cases of type II, an application of Petersen's tagging technique, or data from other outside sources, appear almost essential to determination of the rate of exploitation.—*Auth. abst.*

6332. WILLIAMSON, LYMAN O., and D. JOHN O'DONNELL. (Wisconsin Conserv. Dept.) Muskie food. *Wisconsin Conserv. Bull.* 6(2): 14-18. 1941.—The food of the developing and adult muskellunge is dependent on a food chain which exists in the biological community of lakes. The productivity of the water is limited by the fertility of the bottom and nutrients in the water itself. This food chain is dependent on this productivity. Bacteria of the water convert inorganic and dead organic matter into available substances for use by other living organisms; at the same time these bacteria may be used as food themselves. Plant micro-organisms develop food for animal micro-organisms and both of these may be used as food by higher forms in the lake such as insects, minnows, and fry. The first food of young muskellunge consists of microscopic animals, mostly "water fleas." Soon living midge and mosquito larvae are taken. Young minnows, which, like the other forms are dependent on lower organisms for their nourishment, later become the chief food and from this time the muskellunge feeds entirely on other fishes.—*Herbert McCullough.*

6333. WILSON, DOUGLAS P. (Plymouth Lab.) Oyster rearing on the River Yealm. *Jour. Marine Biol. Assoc. United Kingdom* 25(1): 125-127. 1941.—Records details of a successful rearing on a commercial scale of oyster larvae in tanks on the River Yealm near Plymouth in 1940. Some details are given of the growth rate of young oysters from the 1939 spatfall.—*D. P. Wilson.*

WILDLIFE MANAGEMENT—TERRESTRIAL

(See also B. A. 16(2): Entries 4559, 4843, 5359; and in this issue Entries 6287, 7669, 8076, 8154, 8573)

6334. EDGE, C. N. Gambling with ducks. *Nature Notes* (Peoria, Ill.) 8: 69-73. 1941.—Points out the need for: A universal closed season after Dec. 15; limitation of hunters of migratory birds to 1 geographical zone; no more gradual yielding to pressure; no open season on Wood Duck.—*Courtesy Auk.*

6335. EINARSEN, ARTHUR S. Contributions to the management of California Valley quail. *Murrelet* 22: 8-11. 1941.—Large coveys were unfavorable.—*Courtesy Auk.*

6336. FRISON, THEODORE H. A report of the Natural History Survey. *Illinois Nat. Hist. Surv. Ann. Rept.* 1939-40: 1-27. Illus. 1940.—A map shows the location of field stations and study areas; the expanded wildlife program is described; and separate discussions are given of upland game studies, rabbits and tularemia (485 human cases reported in 1939), and of waterfowl and fur animal investigations.—*Courtesy Wildlife Review.*

6337. HVASS, JENS. Vildkaninen i Danmark. Forekomst, Skade og mulige Bekæmpelse med saerligt Henblick

paa Erfaringen fra England. [Rabbits in Denmark. Occurrence, damage and control, with reference to English experience.] *Dansk Skovforen. Tidsskr.* 1939(2): 49-100. 11 fig. 1939.—Rabbits occur sporadically in Denmark. 23 localities are mentioned. Control measures, based upon personal studies in England, are discussed. Complete extermination can hardly be expected.—*S. O. Heiberg.*

6338. MACKENZIE, H. W. (Wisconsin Conserv. Dept.) Conservation moves forward. *Wisconsin Conserv. Bull.* 6 (1): 3-25. 1941.—A 10-yr. survey of Wisconsin conservation shows an increased demand for more comprehensive activities. Long-time planning in administration must be carried out to bring about the betterment of human welfare by the wise use of natural resources. Proper land use, increased tree plantings in farms and municipal forests, and increased timber sales were evident over the 10-yr. period. Better facilities were made available for fire prevention and law enforcement. The propagation of fish and game and the stocking of certain regions was increased. Training of personnel, research, educational, and recreational activities were increased to give Wisconsin an outstanding advancement in conservation over the 10-yr. period.—*Herbert McCullough.*

6339. MOSBY, HENRY S. Restoring the wild turkey in Virginia. *Virginia Wildlife* 4(1): 11-15. 1 photo. 1940.—Notes on the history of the wild turkey are given. The bird received no effective protection until 1916. The species still occurs in 69 of the 100 counties, to the total number of about 23,000 in 1937. Restocking with purchased stock proving ineffective, the Commission set out to develop a satisfactory procedure. Elements of it are mating of selected brood hens with native wild gobblers and releasing birds four months of age in groups of 15-20. 50% survival is considered satisfactory. The propagated birds are liberated on unoccupied territory; for the older range, improved management and adequate protection are relied upon to keep up the stock.

6340. ORENDRUFF, CARROLL F. The first wildlife inventory of Nebraska shelterbelts. *Nebraska Bird Rev.* 9: 7-8. 1941.

6341. RICHARDSON, FRANK. Results of the southern California quail banding program. *California Fish and Game* 27(4): 234-249. 5 fig. 1941.—This is an analysis of the 755 returns from some 65,000 quail (chiefly valley quail) banded and liberated in southern California from 1932 through 1940. 72.2% of the returns (almost entirely by hunters) are from quail released 6 months or less before the time of their capture. The maximum period of freedom was 4 yrs., 9 months, and 10 days but the ages of the returns indicate a much shorter life span than this as a rule. Game farm-raised quail probably tend to wander farther than wild-trapped quail in becoming established but of all the returns over 53% are from within 2 miles of the point of liberation. The maximum dependable distance is 31 miles. Establishment and breeding of liberated quail is indicated by the usually short distances traveled, but direct and continuous observation will be necessary to complete the evidence.—*Frank Richardson.*

BIOLOGICAL ABSTRACTS

Editor-in-Chief, JOHN E. FLYNN; Assistant Editor, JEAN MACCREIGHT

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GENERAL BIOLOGY

Editors: A. H. GRAVES, *Plant*; C. A. KOFOID, *Animal*

(See also Entries 8862, 9758, 10044, 10084, 10446, 10447, 10449, 10454, 10489, 10632, 10854, 11212, 11230, 11332, 11413, 11426)

PHILOSOPHY OF BIOLOGY

8618. HOFSTADTER, ALBERT. (*New York U.*) Objective teleology. *Jour. Philosophy* 38(2): 29-39. 1941.—A consideration of the problem of objectively determining the presence of teleology in nature, as distinct from the presence of structures which may be correlated with teleology.—*L. J. Lafleur*.

8619. LAFLEUR, LAURENCE J. (*Barnard Coll.*) Relativity in biology. *Acta Biotheoretica* 5(4): 169-176. 1941.—In biology as in other fields there is a choice of units to be taken as fundamental. The ordinary person accepts individuals as fundamental, but there are serious objections as well as advantages to that view. There are disadvantages as well to the hypothesis that the substratum is an analytic unit such as the cell, the molecule or the atom: and perhaps still greater difficulties in taking the synthetic view of the individual as only part of a larger whole. Whereas in other fields the problem of individuality frequently has one solution more attractive than the rest, in biology all 3 are nearly on a par. The answer offered is that of conceptual relativity: that all 3 answers are true, varying from each other only because of the linguistic requirement that a particular section of nature be isolated from the rest as a noun, while the rest is described adjectivally or verbally as dependent upon it. This dependence is linguistic only, not ontological.—*L. J. Lafleur*.

8620. LAFLEUR, LAURENCE J. (*Barnard Coll.*) Theoretical biochemistry. *Acta Biotheoretica* 5(4): 177-183. 1941.—In the extremely wide range of physical conditions found in the astronomical universe, it is possible that life might exist in a much wider variety of forms than found on earth. The article considers, a) to what extent similarities and differences of structure might be expected if life essentially like that on earth should occur elsewhere; b) to what extent a different distribution of elements or compounds would leave life still possible, and the differences of organization that might be correlated with such differences in distribution; c) the possibility that a totally different chemical basis of life is possible. This last possibility is based upon the definition of life as any organization of chemical structures which tends to reproduce itself when placed in an appropriate environment, and a tentative picture of life on earth as arising from the virus. A set of conditions under which this extended nature of life might exist has certain limits of chemical composition, temp., pressure, physical

state, energy, and variation, each of which is discussed.—*L. J. Lafleur*.

8621. LOEWENBERG, RICHARD D. (*San Francisco, Calif.*) The significance of the obvious. *Bull. History Med.* 10(5): 666-679. 7 fig. 1941.—The common root of such modern specialties as Psychosomatic Medicine, Constitutional Research, Endocrinology, Gestalt Psychology, Eugenics, Psychobiology, Graphology, and Characterology is the obsolete physiognomy of the 18th century. Lavater, with whom the vogue originated, was the first to define and recognize the importance of the totality of the organism, the uniqueness of the individual, and the significance of the obvious. He failed, however, to work out special methods. Lichtenberg, who was Lavater's most adequate critic, pointed out the dangers of abuse by an unscrupulous crowd. His merit was that he foresaw a future special science of expressive movements, developed in our day by Klages and others to a physiognomy of functions, which was especially successful in the analysis of handwriting.—*Sister M. E. Keenan*.

8622. PORTERFIELD, AUSTIN L. (*Texas Christian U.*) Creative factors in scientific research. A social psychology of scientific knowledge studying the interplay of psychological and cultural factors in science with emphasis upon imagination. xi + 282p. Duke University Press: Durham, 1941. Pr. \$3.50.—This book is a critique of scientific methods, with emphasis upon the social implications of the scientific methodology. The interplay of psychological and cultural factors in the development of science and the influence of these factors on the work of such men as Darwin and Galileo are discussed at length. The author finds the assumptions of the scientist to be related to his cultural background, and his techniques to be dependent

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upon his methodological assumptions. It is concluded that "the dynamic factor in research consists in the creative control of observation, experimentation, and reasoning."—*Marjorie Gerken*.

MICROSCOPY, TECHNIQUE

8623. ALLEN, R. M. *Photo-micrography*. viii + 365p. 50 pl., 143 fig. D. Van Nostrand Co., Inc.: New York, 1941. Pr. \$5.50.—Photomicrographic equipment and procedures are illustrated and described in an elementary manner based on the author's personal experience. Consequently very few bibliographic references are given. Fundamental principles include descriptions of lenses and the microscope and ex-

planations of aberrations, aperture, magnification, illumination and resolution. American and European commercial equipment is discussed and illustrated with catalog cuts. Instructions are given for making home-made apparatus. A chapter tells how to align the equipment and to take the picture and another gives the processing technic. Special methods include: metallography, darkfield, polarized light, ultraviolet and infra-red radiation, cinephotomicrography, natural color processes, stereophotomicrography, and the electron microscope. Absorption curves for filters and common stains are given. 50 plates with technical data illustrate the author's results. An index is provided.—O. W. Richards.

8624. MANN, LOUIS K., and HAROLD L. JETER. (Ohio U.) A rapid determination of concentration in liquid-in-liquid solutions. *Stain Technol.* 17(1): 25-26. 1942.—A method is deser. for determining % alcohol conc. etc. In the case of miscible liquids a drop of the unknown placed on a slide containing a layer of liquid of known conc. can serve as an indicator. If the drop has a lower S.T. than the layer on which it is placed, spreading occurs. If the S.T. of the drop is higher than the liquid it maintains a convex surface for several secs. before spreading. If the 2 have equal S.T. they mix without surface phenomena.—C. G. Kadner.

8625. MUDD, STUART. The electron microscope. *Jour. Franklin Inst.* 231: 496-498. 1941.—A general summary of a lecture in which the theory, characteristics and applications of the electron microscope were discussed. Results already obtained with the electron microscope are quoted to show its particular usefulness in the examg. and photographing of bacterial and virus preps.—Courtesy *Chem. Abst.*

8626. REES, A. L. G. The electron microscope. *Chem. and Indust. [London]* 60(18): 335-337. 6 fig. 1941.—The physical facts responsible for the improved resolution obtained with electron over optical microscopes are explained. A photograph of the Siemens and Halske microscope in Berlin with electromagnetic focusing is given together with several types of objects at magnifications to 75000. Adaptations and limitations of the instrument to research with bacteria, viruses, living organisms, colloidal metal catalysts, metal smokes, stereomicroscopy and ultramicroscopy are discussed. The article is largely a review of German work.—Roy Hansberry.

8627. ZWORYKIN, V. K., J. HILLIER, and A. W. VANCE. An electron microscope for practical laboratory service. *Elec. Eng.* 60: 157-162. 1941.—The new instrument is much easier to operate and is less crit. in adjustment and alignment. The entire electron optical path of the microscope is under vacuum (10^{-5} mm.). To obtain a resolving power of 10^{-7} cm. the following stabilities are required: overall microscope voltage 0.015, objective current 0.0075, projection lens current 0.068 and condenser lens current 0.1%. Elec. details of construction are discussed at length.—Courtesy *Chem. Abst.*

PHOTOGRAPHY

8628. ANONYMOUS. Photographic equipment. *Indust. Equip. News* 10(1): 38. 1 fig. 1942.—Lamp and reflector for fast flash lighting. Provision is made for synchronization with most types of camera shutter. Any number of the units can be flashed in unison by a photoelectric control when more than one is required to supply the necessary illumination. The flash is accomplished by discharging a condenser through a gas-filled tube. The effective flash duration of 1/30,000 sec. combines high light volume with ability to "stop" virtually any moving object other than a rifle bullet. Quality of the light is sufficient to provide a fully timed negative of an average subject 30 ft. from the camera at a lens aperture of f/11 when used with a recommended film. Manufacturer: Eastman Kodak Co., Rochester, N. Y.—M. A. Raines.

LABORATORY APPARATUS

8629. YOUNG, J. L. (U. S. Chem. Warfare Serv.) An improved moisture determination apparatus. *Soap* 18(1): 59. 1 fig. 1942.—A modified assembly for determining water in soap by the xylene distillation method is described which shortens the time needed when several samples are to be analyzed.—H. F. Smyth, Jr.

8630. ANONYMOUS. Heating element. *Indust. Equip.*

News 10(1): 35. 1942.—Electric wires are woven with glass fibre into a fabric. Manufacturer: Heat Elements, Inc., 313 Niagara St., Buffalo, N. Y.—M. A. Raines.

8631. ANONYMOUS. Testing equipment. *Indust. Equip. News* 10(1): 57. 1 fig. 1942.—For checking on a thyratron, rectifier, or control electronic tube to determine if it is in operating condition. Provides information on wave form, break-down point in cycle, and grid control for a thyratron tube; on current wave-form and plate current on mercury and high-vacuum rectifier tubes; on wave form, and plate current grid-control on high-vacuum control tubes; on wave form and plate current on each half of a two-plate full-wave rectifier tube. Special tubes can be checked by using socket adaptors. The unit is not adapted for ignitron tubes. Equipment includes a 1-in. cathode-ray tube for visual analysis of plate current, a milliammeter, controls to adjust intensity, horizontal and vertical amplitude, focus for the cathode-ray tube, and a phase-shift knob with ten positions. For operation on 110-volt 60-cycle ac. Manufacturer: Weltronic Corp., 3065 E. Outer Drive, Detroit, Mich.—M. A. Raines.

8632. ANONYMOUS. Potentiometer. *Indust. Equip. News* 10(1): 67. 1 fig. 1942.—A decade potentiometer or voltage divider. Made in one to four-dial assemblies, with total resistance to specification within 1,000 to 100,000 ohms. Manufacturer: Shallcross Mfg. Co., Collingdale, Pa.—M. A. Raines.

EXPLORATIONS, EXPEDITIONS, ETC.

8633. LEIGH, RANDOLPH. Forgotten waters. Adventure in the Gulf of California. 324p. Frontispiece, 19 maps, 23 fig. J. B. Lippincott Co.: Philadelphia, 1941. Pr. \$3.50.—The account of a trip in a 35-ton auxiliary schooner into the Gulf of California. Largely concerned with historical aspects of the region, but with frequent considerations of port officials and regulations and of natural resources particularly in minerals and fisheries. The biological and oceanographical information is concentrated chiefly in 5 chapters. In Chap. VII, the observable marine wealth of the Gulf is correlated in part with its contour, which forms an alleged fish trap; on pp. 71-75 there is a popularized account of the ecological equilibrium, and the lower end of the Gulf is reported to have a depth of approximately 11,000 feet. Chap. XV describes the bird rookery on George's Island, Chap. XXII the natural history of some of the fishes, Chap. XXIII considers seals, and Chap. XXVI the whales. The narrative involves activities at, and descriptions of the various ports of call: Acapulco and the adjacent lagoons; Mazatlan; Topolobampo with its shrimp fisheries and gold mining; the tourist center of Guaymas; naked natives and modern nudists in the wilderness of the upper gulf; a hurricane off Santa Rosalia; Mulegé and Concepción Bay, the back country and the oldest mission at Loreto, the present status of the pearl fishing industry at La Paz. There is a consideration, with excerpts from opinions of biologists, on the possible use of plankton for human consumption, but chiefly for the freshwater requirements of shipwrecked sailors. At Cape San Lucas and Todos Santos, some curious Mexican road conditions are mentioned. A 2-ton manta ray was captured on the Pacific coast at Magdalena Bay. The book closes with an account of the tidal bore at the Colorado River entrance, which prefaches the author's main thesis. During Ulloa's explorations 300 yrs. ago, the Gulf is stated to have extended 100 miles above its present head, deposition of silt by the Colorado River having built up that much of the delta since. Mr. Leigh considers it probable, now that Boulder Dam is preventing the further deposition of silt at the river's mouth, that the scouring effect of the tidal bore may encroach into the rich delta area south of Mexicali, destroying the land vegetation by salt water infiltration, and even undermining the 28-foot crest between the Gulf and the Imperial Valley watersheds, so as to admit oceanic waters into Salton Sea, the surface of which is now 287 ft. below sea level, and so inundating thousands of sq. miles of farming country. There is a short bibliography, and an index.—E. F. Ricketts.

8634. ROGER-SMITH, H. Botanising on an Hellenic traveller's tour. *Quart. Bull. Alpine Gard. Soc.* 9(2): 120-123. Col. pl. 1941.

NATURE STUDY

8635. WHEELER, RUTH. *We follow the western trail.* xiv+160p. Illus. Macmillan Co.: New York, 1941. Pr. \$2.—A nature-lover's book written by an enthusiastic camper and observant outdoor-liver, telling of inspiring summer outings chiefly in the mts. and coasts of California where, on foot and by automobile, much thrilling scenery was reached, abundant bird life watched, and other minor adventures lived. The volume holds a good deal of interesting detail, some of it well presented, as in the chapter on forest fires; and always the author and her family have much to see and photograph. While there is no pretense of producing a work on natural history, there is much that is interesting as a picture of phases of bird life, such as the nesting of Rosy Finches with the excellent photographs of these high-altitude birds, while other species afford a comfortable variety. The book is intended rather for pleasant companionship to encourage others to go forth and allow their emotional feelings to be stirred by the splendors of the western scenery and its wild life.—G. M. Allen (courtesy Auk).

INSTITUTIONS, ADMINISTRATION

8636. BHATNAGAR, SHANTI. *The organization of scientific and industrial research in India.* *Chem. and Indust.* [London] 60(48): 839-842. 1941.—A summary of research on vegetable oils, fertilizers, drugs, plastics, sulfur, optical and other scientific instruments, graphite and carbon electrodes, industrial fermentations, glass and refractories, dyestuffs, fuel, cellulose, essential oils, metallurgy and naturally occurring salts.—Roy Hansberry.

8637. DURELLI, AUGUSTO J. *Notas sobre una universidad norteamericana.* [Observations on a North American university.] *Agronomia* [Buenos Aires] 30(2): 105-112. 1941.—The author bases his observations mainly on the Massachusetts Institute of Technology, commenting on the informality of university life,—both class-room behavior and student-teacher relationships scholastic and private. He pays tribute to the beauty of university campuses in general in both structural and landscape architecture; to the devotion of the university to research in both pure and applied branches of learning; and to the spirit of collaboration between professors and universities, and with the various Federal agencies. The American university library in respect to its completeness and accessibility is favorably commented on.—J. W. Gilmore.

8638. FOWLER, RICHARD. *(U. Mississippi.) The University of Mississippi.* *Bios* 12(4): 213-215. Illus. 1941.—A brief review of its 100 years.—L. J. Gier.

8639. FRISCH, JOHN A. *(Canisius Coll., Buffalo, N. Y.) Biology at Canisius.* *Bios* 12(4): 216-218. Illus. 1941.—A history of the department.—L. J. Gier.

ETHNOBIOLOGY

(See also Entries The ape in antiquity, 8655; Origin of wheat, 8747; Peking duck, 9915)

8640. SCHULTES, RICHARD EVANS. *The meaning and usage of the Mexican place-name "Chinantla."* *Bot. Mus. Leaf., Harvard Univ.* 9(6): 101-116. May 1941.—The subject is discussed from a botanical, floristic, ecological, and taxonomic point of view. The term "Chinantla" should be confined to a limited rain-forested area in Oaxaca (see map), and should not be applied to the whole area inhabited by the Chinantece Indians, which includes many types of terrain. 32 references.—W. C. Tobie.

8641. TRAIN, PERCY, JAMES R. HENRICHES, and W. ANDREW ARCHER. *Medicinal uses of plants by Indian tribes of Nevada.* *Contr. Flora Nevada, Div. Pl. Explor. and Introduct., Bur. Pl. Indust., U. S. Dept. Agric.* 33(1/3): 1-

199. 1941.—Contains Introduction with discussion of method of field studies, map of Indian population of Nevada, and partial vocabulary of Indian names and terms. The body of the text consists of discussions of the individual spp., listed alphabetically by species, with the Indian and English names and the uses of each plant given. Part 3 contains a list of undetermined spp., an index to the medicinal uses of the plants, and an index of the scientific, common, and Indian names of the plants.—R. W. Pohl.

TEXTS AND EDUCATION

8642. BAYLES, ERNEST E. *(U. Kansas), and R. WILL BURNETT (Stanford U.) Biology for better living.* xiv+749p. Illus. Silver Burdett Co.: New York, 1941. Pr. \$2.28.—This is a general biology textbook of the survey type dealing with biology in relation to many of the fundamental problems of living. The book is divided into 8 units, each emphasizing the basic biological facts and principles in connection with soil conservation, personal and social improvement of health, the embryological development and genetic improvement of man and the animals and plants upon which he depends. There are chapters on how green and non-green plants obtain food, how plants and animals adapt themselves to their environment and how the body carries on its activities. There are many appropriate illustrations, some of them original. The book is evidently intended as a text not necessarily associated with laboratory work.—J. C. Johnson.

MISCELLANEOUS

8643. ARCHBOLD, RICHARD. *(Amer. Mus. Nat. Hist.) Flight to the stone age.* *Trans. New York Acad. Sci.* 2(3): 95-98. 1940.—New Guinea, a land of cannibals and head-hunters who use axes of stone and wooden sticks for plows, is referred to as the last stand of the Stone Age Man; to the biologist it is a virgin field.—H. H. LaFuze.

8644. ATKINS, LILLIAN. *(Mississippi State Coll. Women.) Red and green.* *Bios* 12(4): 238-240. 1941.—A discussion of the significance of these colors with special reference to chlorophyll and hematin, and their possible relationships.—L. J. Gier.

8645. CHAUDHURI, H. *A plea for better coordination of botanical work in India.* *Jour. Indian Bot. Soc.* 20(3): 145-156. 1941.—Presidential address, 20th Annual meeting, Ind. Bot. Soc.—P. D. Strausbaugh.

8646. CONWAY, E. J. *Paleochemistry of the ocean.* *Nature* [London] 147: 480. 1941.—The K/Na ratio in igneous rocks is 0.92, so it is doubtful if the ratio in the original ocean was more than one, although values as high as 2 have been assumed. The oceanic salinity at the beginning of the Cambrian period was probably between 1.6 and 2.—H. E. Wirth (courtesy Chem. Abst.).

8647. PACIFIC SCIENCE ASSOCIATION. *Proceedings of the Sixth Pacific Science Congress of the Pacific Science Association held at the University of California, Berkeley, Stanford University, and San Francisco, July 24th to August 12th, 1939.* *Proc. Pacific Sci. Congr.* 1: 1-450; 2: 451-914; 3: 1-754, and 4: 1-993. Illus. 1940.—Volume 1 contains, in pp. 1 to 64, a general account of the Congress, representation (by nations), organization and officers, a list of the delegates, minutes of the business sessions and an account of the technical sessions, personnel of the program committees, and a topical outline of the sectional program. Pages 65-450, and the whole of Vol. 2 (p. 451-914), are given over to papers on geophysics and geology. Volume 3 (p. 1-754) is devoted to papers on oceanography and marine biology; and Volume 4 to anthropology (1-181), zoology (183-253), entomology (255-496), botany (499-778), forest resources (779-841), soil resources (843-983), and climatology (985-993).

BIOGRAPHY AND HISTORY

CARROLL W. DODGE, *Editor*

(See also Entries 8621, 8638, 9339, 9915, 9998, 10139, 10154, 10202)

HISTORY

8648. BEATO NÚÑEZ, V. *Historia de la Parásitología y de la Medicina Tropical en Cuba, con especial referencia a*

los datos bibliográficos. *Bibliografía. (Continuación).* *Rev. Med. Trop. y Parásitol. Bact., Clín. y Lab. [Havana]* 7(5): 104-105. 1941.—Covers the literature on parasitology and

tropical medicine as developed in Cuba between the years 1878 and 1888.—A. C. Walton.

8649. BRUCE, GORDON M. A note on penal blinding in the middle ages. *Ann. Med. Hist.* 3(5): 369-371. 1941.—Blinding, as a modification of capital punishment, began in the 6th century and was preferred by the Church as it gave opportunity for repentance. Among the crimes punishable by blinding were rebellion, theft, breaches of the forest laws, arson, perjury, counterfeiting, rape and felonious assault. The methods employed in inflicting this penalty were crude and mutilating. The eyes were usually dug out with a sharp or red hot instrument and the criminal so punished was known as "exoculatus."—L. F. Edwards.

8650. DIETHELM, OSKAR. (Cornell U. Med. Coll., New York.) A historical review of psychiatric treatment. *Psychosom. Med.* 3(3): 286-294. 1941.—Psychiatric treatment is reviewed from the time of Paracelsus to the present. In the early centuries when magical concepts prevailed in medicine, the idea that the insane were possessed of demons was widely accepted. The discoveries of general medicine have been empirically tried upon psychotic patients—chemical compounds, blood letting, pharmacological treatment, etc. Changes in philosophy have also markedly affected treatment in psychiatry. As a result of the changing attitude in regard to human problems, the physician became interested in the behavior of his patients. The scientific development of psychiatry has been more recent. The generalization appears true that "treatment has always been dependent on the status of medicine at the time, on leading psychological concepts, especially the concept of the relationship between body and mind, and on current cultural influences." The author concludes that "a historical review of psychiatric treatment fosters a sound therapeutic optimism. It demonstrates the great progress made and offers a hopeful vista of the future."—William Galt.

8651. FITZ, REGINALD. (Harvard Med. Sch., Boston.) The surprising career of Peter La Terrière, Bachelor in Medicine. *Ann. Med. Hist.* 3(4): 265-282; (5): 395-417. 1941.—Pierre de Sales La Terrière, born Sept. 23, 1747 in the chateau de Sales of Languedoc, studied medicine for 18 months under the preceptorship of the fashionable Parisian, Dr. Rochambeau. In 1766 he sailed to Quebec, Canada, where he spent an adventurous career as business man and physician. In 1779, being falsely accused of aiding the American cause, he was imprisoned at Quebec during which time he occupied himself by building small-scale models "and he was perhaps the first medical man to describe, in his 'Memoires,' the benefits of occupational therapy." Failing to pass the examination required by the Medical Registration Act passed May 1788 he journeyed to Cambridge, Mass. to enter the newly established Harvard Medical College where he was awarded in 1789 the M.B. degree, the title of his dissertation being "Puerperal Fever." "He was Harvard's first medical transfer student and the first person ever to receive a medical diploma from Harvard or any other New England institution of learning." His memoirs, though full of inaccuracies, are of interest in that they paint a colorful picture of Harvard in its early days. Returning to Quebec he was licensed to practice and after a successful career as doctor and pharmacist retired in 1807. He died June 16, 1815 in his Manor House at Les Eboulements which still stands today.—L. F. Edwards.

8652. HAGGIS, A. W. (Wellcome Hist. Med. Mus., London.) Fundamental errors in the early history of cinchona. II. *Bull. History Med.* 10(4): 568-592. 1941.—In all probability the romantic story of the cure of the Countess of Chinchon by cinchona is no more than a fable. Furthermore, it is unlikely that the Count of Chinchon was the first to introduce the febrifuge into Europe since he did not arrive there until 1641, while the earliest reliable descriptions of the remedy were made in Peru 12 yrs. earlier. Throughout the 17th century a vast trade was done by merchants bringing medical substances to Europe from the New World, hence it is likely that cinchona was introduced not long after 1633.—Sister M. E. Keenan.

8653. LENNOX, WILLIAM G. (Harvard Med. Sch., Boston.) Bernard of Gordon on epilepsy. *Ann. Med. Hist.* 3(5): 372-383. 1941.—Included in this paper is a translation of the chapter on epilepsy from the 1491 edition of Bernard's

"Lilium Medicinae" or Practice of Medicine in which are discussed the causes, signs, prognosis and cures of this malady. As to its causes, Bernard adhered to the age-old humoral explanation, namely, that a humor blocks the non-principal ventricles of the brain thus interfering with the supply of breath to the limbs. He also accepted the prevailing notion that the nerves by their shortening exert a mechanical pull on the muscles, thus producing the typical spasms. As to its signs, Lennox points out that "the author rightly emphasizes the variety of forms which the seizure may show, and the variety also of precipitating causes." Under prognosis Bernard refers to the favorable aspect of seizures and to the difficulty of affecting a cure in cases of inherited epilepsy. The "cures" or treatment contain, for the most part, an element of the supernatural although the list of foods and drinks to be avoided is well recognized today.—L. F. Edwards.

8654. McLAUGHLIN, EDWARD F. (Philadelphia, Pa.) The guilds and medicine. *Ann. Med. Hist.* 3(5): 384-394. 1941.—During the early Middle Ages medicine was largely in the hands of the clergy, who were bound together in a loose association by the common patronage of Saints Luke, Cosmas and Damian, the latter 2 physicians having been canonized after being beheaded by the Romans. During the Crusades certain of the clergy and knights became organized into Orders, e.g., the Order of Cosmas and Damian, which cared for the sick and wounded. They established bases and branches in Europe and continued their medical work at home during lulls in the Crusades, thus paving the way for the later guilds of military surgeons. Also as a result of the Crusades towns arose and commercial intercourse was initiated giving rise to a new economy and improved business conditions with the formation of monopolies and trade guilds. By 1500 the guild system included workers in nearly every occupation, even those engaged in the art of medicine. As to the causes for the organization of Medical Guilds the author cites the following: (1) more laymen were being trained in medicine in the rapidly growing universities; (2) regulations of the Church forbidding practice to the clerics, e.g., the Councils of Rheims (1131), of Tours (1163) and of LeMans (1247) and (3) endorsement and encouragement by the Church of physicians' guilds. In Italy Medical Guilds flourished earlier than in northern Europe, a College of Physicians and Surgeons having been established in Venice as early as the 14th century. In France surgery was largely in the hands of the barber-surgeons who had no university training. However, in 1226 the College of St. Come was established by King Louis IX at the suggestion of Jean Pitard for the purpose of teaching surgery and from which emerged the French Academy of Surgery and still later the National Society. In England graduate physicians and the medical faculty constituted a guild ipso facto after guilds were introduced. The Barber Surgeons Company of London was founded as a guild in 1309 and chartered in 1462 by Edward IV. The barbers and surgeons were separated in 1745 by an Act of Parliament, the Surgeons Company eventually becoming the Royal College of Surgeons. The military surgeons had a separate guild chartered in 1369 and the Medical Guild, through the constructive efforts of Thomas Linacre, was reorganized in 1518 as the Royal College of Physicians. The author concludes that the guild system was a good thing for medicine since the latter "changed from a passive art—which was ever dependent on the whim of its patron (whether that patron was Church, State, Prince, Superior) to a self-regulating, active practice."—L. F. Edwards.

8655. MONTAGU, M. G. ASHLEY. (Hahnemann Med. Coll., Phila.) Knowledge of the ancients regarding the ape. *Bull. History Med.* 10(4): 525-543. 1941.—Professor W. C. McDermott's identification (in his work, *The Ape in Antiquity*, The Johns Hopkins University Studies in Archaeology, No. 27. Baltimore: The Johns Hopkins Press, 1938) of a figure on an Eighth Century (B.C.) bowl from Cyprus as a gorilla is startling since the first definite record of this animal was not made until 1847 when Savage and Wyman published the first account of that anthropoid. The bowls from Preneste and Cypriote Curium described by McDermott do not throw any light upon the knowledge of the ancients regarding the ape in general and of the

anthropoids in particular. The phenomenon described by Agaratharchides, which McDermott believed "to be due to the observation of a diseased animal, or to confusion with the ischial callosities which are present in this species," was the sexual skin of the ♀ baboon at the time of its maximum enlargement.—*Sister M. E. Keenan.*

8656. PEPPER, O. H. PERRY. (Philadelphia, Pa.) A note on David Byron and dengue. *Ann. Med. Hist.* 3(5): 363-368. 1941.—David Byron (commonly misspelled "Brylon" and "Boylon") was the first person to report on an epidemic of dengue fever which occurred in March 1779 in Batavia. Included in the present paper are facsimiles of the 14 pages of Byron's original article, which was written in somewhat old-style Dutch and published in the Transactions of the Batavia Society of the Arts and Sciences. Translated excerpts describing symptoms and treatment are presented. Aside from the information that Byron was "Stads Chirurgyn" to the City of Batavia nothing is known of his life.—*L. F. Edwards.*

8657. RODDIS, LOUIS H. (Navy Dept., Washington, D. C.) A short history of nautical medicine. *Ann. Med. Hist.* 3(3): 203-247; (4): 326-352; (5): 418-447. 1941.—The author discusses the subject under the following headings (Parts): I—Early nautical medicine, II—Disease and disaster in the old sailing ships, III—The medical departments of naval vessels, IV—The rise of naval hygiene, V—Naval medicine in the U. S. Navy, VI—Hospitals and seamen and hospital ships, VII—Nautical medicine and the merchant marine, VIII—The uniforms and insignia of medical men afloat, and IX—Research in nautical medicine. The development of nautical medicine is traced from the Greeks, Phoenicians and Romans to modern times in correlation with improvements in the art of navigation and changes in naval warfare including discussion of problems of crowding; air, food and water supply; heating, lighting and ventilation of vessels; prevention and treatment of maritime diseases (scurvy, cholera, typhus, etc.); improvements in methods of care of sick and injured and of medical and surgical quarters on ships; duties, uniform and pay of naval surgeons; outstanding naval surgeons of the past and their contributions (Edward Cutbush, Usher Parsons, Amos Evans, Elisha Kent Kane, etc.); establishment of the Naval Medical School, Naval Medical Bulletin, Naval Dental Corps, female nurse corps and the Maritime Hospital Service. Suggested subjects for research in nautical medicine are offered among which is research in naval medical history. A chronological list of important events in general naval history and naval medicine is appended.—*L. F. Edwards.*

8658. ROLLESTON, HUMPHRY. Medical aphorisms, chiefly in English. *Bull. History Med.* 10(4): 544-567. 1941.—Aphorisms, embodying the results of mature experience or thought, have been used by the medical profession from the days of Hippocrates down to the present time. Medical men continue to make and to collect medical aphorisms.—*Sister M. E. Keenan.*

EVOLUTION

ALFRED EMERSON, *Editor*

(See also Entries Speciation in persimmon, 8681, in Orthopteran 8722, in *Gossypium*, 8735, in *Poa*, 8740, in *Viola*, 8778, in *Drosophila*, 8841, 8852, in cultivated plants, 10452, in *Tradescantia*, 10463, in *Rubus*, 10489, in *alfalfa*, Caucasian, 10253, in *Polianthus* (Monocot), 10566, in *Rubiaceae*, 10575, in smut fungi, 10870, in *Helminthosporium* (fungi), 10877, in wheat rust fungus, 10951, in citrus scale insect, 11052, in *Corizus* (bug), 11230, in *Ephemeroptera*, 11275, in Galapagos birds, 11395; Structural hybridity in *Scilla*, 8692; Cavernicolous animals, 8903; Prairie grass, 8932; *Crataegus* in Florida, 8942; Origin of flowering plants, 10447; Sedge, 10462; Attenuation of phytopathogenic fungus, 10935; Physiol. specialization in smut fungus, 10953; Antiquity of fossil insects, 11281; Phylogeny of fish, 11290; Range extension in birds, 11403)

8672. BARATTINI, LUIS P. Alteraciones con cierto carácter constante observadas en algunas especies Uruguayas. *Rev. Chilena Hist. Nat. Pura y Aplicada* 43: 44-47. 1939.—Mutations which are more or less constant in character are reported in several spp. of fish, mollusks, and beetles. Various morphological parts are affected; the species belong to the genera *Acestorhynchus*, *Meluccius*, *Menidia*, *Mactra*, *Ampullaria*, *Scotobius* and *Psiloptera*.—*L. S. Dillon.*

BIOGRAPHY

8659. ALLEN, E. J. Arthur James Smith (1871-1941). *Jour. Marine Biol. Assoc. United Kingdom* 25(2): 223-224. Portrait. 1941.

8660. ALLEN, R. G. Dr. Andrew W. Smyth. *New Orleans Med. and Surg. Jour.* 94: 292-294. 1941.—Biography of the first surgeon to successfully ligate "the innominate artery to cure an aneurysm of the third portion of the subclavian." (1832-1916; born, and died County Tyrone, Ireland; resided, New Orleans, 1849-94; famous operation—1864).—*A. C. Casey.*

8661. COHN, I. Reflections on Edmund Souchon (1841-1924). *New Orleans Med. and Surg. Jour.* 93: 550-557. 1941.—Biography of a pioneer in the "preservation of anatomic dissections with permanent color of muscles and organs by two methods." His specimens are preserved at Tulane U.—*A. C. Casey.*

8662. DAVENPORT, C. B. J. Arthur Harris. [1880-1930.] *Genetics* 27(1): i-ii. Portrait. 1942.

8663. DAVIS, J. J. Willis Stanley Blatchley. *Ann. Ent. Soc. America* 34(2): 279-283. 1941.—An obituary notice with a brief summary of Blatchley's activities and a photograph.—*J. L. Buys.*

8664. GRAHAM, SAMUEL A. Royal Norton Chapman 1889-1939. *Ann. Ent. Soc. America* 34(3): 521-524. 1941.—A brief summary of Chapman's activities and a photograph.—*J. L. Buys.*

8665. HARTLEY, CARL. (U. S. Dept. Agric.) Haven Metcalf [1875-1940]. *Chron. Bot.* 6(19/20): 460. 1941.—Plant pathologist.

8666. HEYMANS, C. In memoriam Prof. Dr. A. K. M. Noyons. *Arch. Internal. Pharmacodyn. et Thér.* 66(3): 243-244. 1 fig. 1941.—Obituary notice, with biography, of Prof. Noyons of Utrecht.—*G. A. E.*

8667. HOWE, PAUL E. Edward Browning Meigs. (1879-1940.) *Jour. Biol. Chem.* 142(1): 1-2. 1942.

8668. MCKAY, HELEN M. William John Burchell, Botanist. IV. *Jour. S. African Bot.* 6(4): 173-183. 4 pl. 1941.—The concluding part in the series deals with the later years of Burchell's life from 1833 till his death in 1863. While not attempting to be a biography this paper gives a chronological account of Burchell's main activities in relation to botany and some account of his journeys. Though Burchell left little published record of his work he had a high reputation among his contemporaries, a reputation that is shown to be fully deserved from a study of his methods, correspondence, and unpublished memoranda.—*R. S. Adamson.*

8669. MOORHOUSE, S. The Boltons of Halifax. *Jour. Bot.* 79(945): 156-158. 1941.—Biographical notes.—*E. D. Merrill.*

8670. NIETO, D. El Dr. Julio Wagner-Jauregg. *Ciencia* 2(2): 80-81. 1941.—A biography and obituary of this distinguished Austrian neurologist and psychiatrist, 1857-1940.—*W. C. Tobie.*

8671. OBITUARY. Jacob Goodale Lipman [1879-1939]. *Chron. Bot.* 6(19/20): 459-460. 1941.

8673. BARBER, H. N. (John Innes Hort. Inst., Merton Park, London, S. W. 19.) Evolution in the genus *Paeonia*. *Nature [London]* 148(3747): 227-228. 1941.—The haploid chromosome number, 5, is considered the basis of species diversity in *Paeonia* by which 3 main centers of distribution are recognized: The Mediterranean and Black Sea basins, the Far East from Tibet to Japan, and N. America.—*E. D. Crabb.*

8674. BUGBEE, ROBERT E. (Fort Hays [Kansas] State Coll.) An analysis of local populations in the continental species *E. rhois*. *Trans. Kansas Acad. Sci.* 44: 228-233. 1941.—Four separate characters—length of the scape, total length, length of the abdomen and length of the 6th abdominal segment—of 100 insects each, chosen at random, from 4 localities (Jamestown, N. Y., Meadville, Pa., Bloomington, Ind., and Toronto, Kans.) were studied and measured. The measurements were plotted as rectangular frequency polygons and the arithmetic means calculated. Although the range of variation was much the same for any one structure at all 4 localities, each polygon had a different shape; apparently each population had different gene frequencies which accounted for the differently appearing figures. In most cases the means were also different. Where they were the same the polygons, however, were different in shape. Material from the same locality, but on different hosts, presented differences, sometimes in mean, always in the shape of the polygon. At Bloomington, Ind. the means were the same or very close; at Meadville, Pa., there was considerable difference between the means. Evidently the wide ranging, continental species *E. rhois* is made up of smaller populations each of which displays differences in the form of certain gene frequencies which occur more often at any one locality than at others. Thus each population is genetically distinct from any of the others even though they still retain the same limits of "hereditary variability" characteristic of the whole species in greater or lesser degrees. Further, this seems to support the hypothesis that new species may originate by the splitting of the range of a wide-ranging species into smaller populations which are at first only partially isolated from the other populations. As time passes and the isolation becomes more concrete, some characteristic gene frequencies are lost, or the "inheritable variation" is reduced, while other gene frequencies become fixed. Thus the smaller populations may become a new species. *E. rhois* probably represents a species that is in the process of breaking up into smaller populations and ultimately new species. The material from Jamestown, N. Y. seems to represent a small isolated population that in 2 characteristics at least shows noticeable differences from the rest of the populations and may be further along the path toward speciation than the others.—Auth. summ. and concl.

8675. CAMP, W. H., and C. L. GILLY. (New York Bot. Garden.) Biosystematy and the concept of the species. *Amer. Jour. Bot.* 28(10): 18s. 1941.—An abstract.

8676. CLELAND, RALPH E. (Indiana U.) The origin of "decipiens" from the complexes of *Oenothera lamarckiana* and its bearing upon the phylogenetic significance of similarities in segmental arrangement. *Genetics* 27(1): 55-83. 1942.—*O. lamarckiana* throws a small % of "half-mutants," of which *erythrina* is one. This form is made up of 2 complexes, one of which is the unmodified *velans* of *lamarckiana*, the other a modified complex called "decipiens" which appears to have derived some of its genetical make-up from both *velans* and *gaudens* of *lamarckiana*. A comparison of these 3 complexes from the standpoint of segmental arrangement suggests that "decipiens" has been derived from *velans* by 2 interchanges, but the apparent presence of *gaudens* genes in "decipiens" makes this supposition unlikely. It is shown that there are 24 ways by which a complex with the "decipiens" segmental arrangement could have arisen from the complexes of *lamarckiana*, assuming a succession of 2 interchanges. In each of these, *gaudens* chromosomes are involved in one or the other of the interchanges, and in some cases only *gaudens* chromosomes are involved in both interchanges. In all cases, however, the resultant "decipiens" has a mixture of *velans* and *gaudens* segments. However, not all of the 24 ways here listed are necessarily actual possibilities, the actual number of ways in which the "decipiens" segmental arrangement could be formed being determined by the position of *velans* and *gaudens* lethals in their respective complements. The *velans* lethals cannot be present in ends .3, .4, .9, .10, .12, and the *gaudens* lethals are not in .5 or .6. The fact that "decipiens" seems to differ from "hookeri" by a single interchange but is known to have been derived from *lamarckiana* by at least 2 interchanges emphasizes the fact that similarity in segmental arrangement between complexes is not always an exact indication of the degree of phylogenetic relationship between these complexes. One must exercise proper caution in ascribing to similarity in segmental arrangement its proper phylogenetic significance.—R. E. Cleland.

8677. MAZENOT, G. La "loi" de l'accélération phylogénique ou de la précéSSION des caractères (loi de A. P. Pavlov). *Bull. Mens. Soc. Linn. Lyon* 9(5): 75-80, 6 fig. 1940.—Pavlov's law (1901) and Gausser's hypothesis are demonstrated by the appearance of a siphonal furrow on the Palaeopholitidae (ammonites) *Perisphinctes pouzinensis*, *Dalmasiceras avistidus*, *D. dalmasi*, *Berridsella oppeli*, and *B. ciliata*. The new evolutionary character is acquired by the young animal, not by the embryo, and is attained much slower by the adult.—H. Simons.

CYTOLOGY

Editors: R. E. CLELAND, *Plant*; C. E. McCLUNG, *Animal*

(See also Entries 8673, 8675, 8676, 8732, 8735, 8736, 8740, 8741, 8745, 8746, 8758, 8762, 8767, 8769, 8771, 8777, 8780, 8783, 8784, 8788, 8851, 9978, 10371, 10376, 10442, 10457, 10520, 10557, 10559, 10566, 10570, 10575, 10576, 10577, 10578, 10870, 10890, 11123, 11156, 11165, 11197)

GENERAL

8678. GEITLER, L. [New results and problems of chromosome structure.] *Naturwiss.* 28: 649-656. 1940.—A review of recent work on fine structure of chromosomes with more than 60 references.—B. J. C. van der Hoeven (in *Chem. Abst.*).

8679. MILNE, LORUS J. Preparing an animated diagram of somatic mitosis. *Biol. Bull.* 81(2): 290-291. 1941.

PLANT

8680. BALDWIN, J. T. Jr. (U. Michigan.) Cytophyletic analysis of *Astranthium integrifolium*. *Bull. Torrey Bot. Club* 68(9): 615-617. 1941.—*A. integrifolium* has an *n*-number of 4 chromosomes, a *2n*-number of 8; *Bellis*, as investigated by other workers, has a basic number of 9: these chromosomal data support the separation of *Astranthium* from *Bellis*.—J. T. Baldwin, Jr.

8681. BALDWIN, J. T. Jr., and RICHARD CULP. (U. Michigan.) Polyploidy in *Diospyros virginiana* L. *Amer. Jour. Bot.* 28(10): 942-944. Map, 1 fig. 1941.—*D. virginiana*, a pheiotypically variable species, has 2 chromosome-number races: *2n*=60 and 90. The distribution of the races is discussed and their horticultural importance suggested. In *D. texana*, *2n*=30.—Auth. summ.

8682. BEATTY, ALVIN V. (U. Alabama.) Mitotic periodicity in leaves. *Genetics* 27(1): 131. 1942.—An abstract.

8683. BROWN, WALTER V. Cytological studies in the Oryzeae and Zizaneae. *Jour. Elisha Mitchell Sci. Soc.* 57 (2): 201-202. 1941.—An abstract.

8684. BRUMFIELD, ROBERT T. (Yale U.) Cell growth and division in a living root meristem. *Amer. Jour. Bot.* 28(10): 1s. 1941.—An abstract.

8685. CLELAND, RALPH E. (Indiana U.) Report on the analysis of segmental arrangements of *Onagra* complexes. *Genetics* 27(1): 137-138. 1942.—An abstract.

8686. CORNMAN, IVOR. Disruption of mitosis in *Colchicum* by means of colchicine. *Biol. Bull.* 81(2): 297-298. 1941.

8687. CROSS, G. L., and T. J. JOHNSON. (U. Oklahoma.) Effects of colchicine upon the apical meristem of *Vinca rosea*. *Amer. Jour. Bot.* 28(10): 2s. 1941.—An abstract.

8688. EIGSTI, O. J. (U. Oklahoma.) A comparative study of the effects of sulfanilamide and colchicine upon mitosis of the generative cell in the pollen tube of *Tradescantia occidentalis* (Britton) Smyth. *Genetics* 27(1): 141-142. 1942.—An abstract.

8689. GOPAL-AYENGAR, A. R. (U. Toronto.) Chromo-

some structure in somatic and homotypic chromosomes. *Amer. Jour. Bot.* 28(10): 3s. 1941.—An abstract.

8690. GOPAL-AYENGAR, A. R. (U. Toronto.) The origin and behaviour of chiasmata in *Bellevilia* species. *Amer. Jour. Bot.* 28(10): 3s. 1941.—An abstract.

8691. GOPAL-AYENGAR, A. R. (U. Toronto.) Structure and behaviour of meiotic chromosomes in Gymnosperms. *Genetics* 27(1): 143. 1942.—An abstract. Studies on spp. of *Pinus*, *Taxus* and *Ginkgo* are briefly reported.

8692. GOPAL-AYENGAR, A. R. (U. Toronto.) Structural hybridity in *Scilla* species. *Genetics* 27(1): 143-144. 1942.—An abstract.

8693. HECHT, ADOLPH. (Indiana U.) Cytogenetic studies of *Oenothera*, subgenus *Raimannia*. *Amer. Jour. Bot.* 28(10): 3s. 1941.—An abstract.

8694. JEFFREY, EDWARD C., and EDWIN J. HAERTL. (Harvard U.) The present status of synapsis and chiasmaticity. *Amer. Jour. Bot.* 28(10): 4s. 1941.—An abstract.

8695. JEFFREY, EDWARD C., and EDWIN J. HAERTL. (Harvard U.) Chromosomal phenomena in fertilization. *Genetics* 27(1): 149-150. 1942.—An abstract. Studies on *Lilium*, *Tradescantia* and *Erythronium* are briefly reported.

8696. JENSEN, HENRY W. Heterochromosome formation in *Benzoin aestivale*. *Jour. Elisha Mitchell Sci. Soc.* 57(2): 202-203. 1941.—An abstract.

8697. MODILEVSKII, J. S., and L. K. DZIUBENKO. (Cytogenetical investigation of the genus *Nicotiana*. VIII. Embryology and cytology of the amphidiploid *N. rustica* var. *pumila* \times *N. paniculata*.) [With Eng. summ.] *Zhurnal Inst. Bot. Vuan (Jour. Inst. Bot. Acad. Sci. Ukraine)* 31: 3-12. Illus. 1940.—*N. rustica* var. *pumila* was hybridized with *N. paniculata* and amphidiploids were readily formed. Development of the embryo and endosperm proceeds more rapidly in F_1 than in the parental strains. No prophases were found in F_1 in either p.m.c. or embryo sacs, which would allow for the formation of diploid gametes. No diads were observed in the loculi of anthers containing tetrads. The great majority of pollen grains in the mature anthers degenerated. Only rarely were isolated pollen grains found containing either 2 similar nuclei or a generative cell with a vegetative nucleus. The morphologically normal pollen grains did not exceed the degenerated ones in size, which is evidence against diploidy in their nuclei. The embryo sacs, forming like the *Scilla* type as a result of heterotypic and homeotypic division, transformed into binucleate sacs without giving any grounds for the belief that these embryo sacs are diploid. Nevertheless, somatic plates with a chromosome no. of about 72 were observed in the embryo cells in F_1 , and flowering and fruiting amphidiploid specimens were found in F_2 . Gamete formation is, in F_2 , accompanied by the fairly slight disturbances usual for amphidiploids in *Nicotiana* during the separation of the chromosomes in the anaphases of the heterotypic or homeotypic division; in metaphase of the heterotypic division, tetravalents are sometimes formed in place of some of the 36 bivalents. Regular vacuolization is not infrequently disturbed at the 2-nucleate stage of the embryo sac. As a result, the separation of the nuclei towards the poles is delayed or leads to the formation of rather numerous anomalous embryo sacs. The statement of Lammerts and Singleton that the frequency of amphidiploid formation during the crossing of *N. rustica* var. *pumila* \times *N. paniculata* is conditioned by an abundant formation of diploid ♂ and ♀ gametes in F_1 , is not confirmed.—Auth. summ.

8698. PERRY, BRUCE A. (U. Virginia.) Chromosome number relationships in the genus *Euphorbia*. *Amer. Jour. Bot.* 28(10): 4s-5s. 1941.—An abstract.

8699. RAGHAVAN, T. S., and A. R. SRINIVASAN. Cytogenetical studies in *Nicotiana*. I. Cytology of *Nicotiana glutinosa* and *N. tabacum* var. *macrophylla* and the F_1 hybrid between them. *Jour. Indian Bot. Soc.* 20(5/6): 307-340. 1 pl., 82 fig. 1941.—Cytological studies of this hybrid are reported in detail. Cytomixis is discussed with reference to polyploidy. The scattered arrangement of chromosomes at metaphase I is discussed in relation to haploidy and asynaptic interspecific hybrids. Attention is given to the various methods of dyad formation. Generally pollen grains are not viable but some good pollen is produced. Viable pollen grains are probably polyploid and are 2-celled when shed. Interspecific hybridization is discussed as a means of ascertaining ancestral homology. Polyploid gamete formation is also discussed.—P. D. Strausbaugh.

8700. RANDALL, THOMAS E., and CHARLES M. RICK. (U. California.) Preliminary cyto-genetic studies on polyembryony in *Asparagus officinalis* L. *Amer. Jour. Bot.* 28(10): 5s. 1941.—An abstract.

8701. RICK, CHARLES M. (U. California.) Cytological irregularities induced in *petunia* by X-ray treatment of pollen. *Genetics* 27(1): 164. 1942.—An abstract.

8702. RILEY, H. P. (U. Washington.) Chromosomal behavior in two natural *Tradescantia* triploid hybrids with centric fragments. *Genetics* 27(1): 165-166. 942.—An abstract.

8703. ROMAN, HERSCHEL. (U. Missouri.) Translocations involving "B" chromosomes in maize. *Genetics* 27(1): 167. 1942.—An abstract.

8704. SCOTT, FLORA MURRAY. (U. California.) Nuclear size, in *Echinocystis* and in *Cucurbita*. *Amer. Jour. Bot.* 28(10): 6s. 1941.—An abstract.

8705. SCOTT, FLORA MURRAY, and MARY REYNOLDS. (U. California.) Traumatic acid and mitosis in *Ricinus communis*. *Amer. Jour. Bot.* 28(10): 5s. 1941.—An abstract.

8706. SOLOMON, MARVIN D., and J. A. TRENT. (Kansas State Teachers Coll.) Preliminary report on periodicity and rhythmicity of mitotic phases of root tips under varying light conditions. I. *Allium cepa*, L. *Trans. Kansas Acad. Sci.* 44: 202-207. 1941.—A definite hourly rhythmicity of mitosis was found in the root tips of *Allium cepa* under normal day-night conditions, and under continuous light. A daily periodicity was found under conditions of continuous light and continuous dark but not with normal day-night alternation. Mitotic figures under normal conditions were twice as numerous as under uniform conditions of continuous light and continuous darkness. Those occurring under the latter two conditions were about the same. The number of prophase figures under all 3 conditions greatly exceeds the metaphase, anaphase, and telophase. This stage dominates and determines the total mitotic curve. In every case the total curve is very close to, and parallels the prophase curve.—Auth. summ.

8707. SPARROW, A. H. (McGill U.) Spiraling in microspore chromosomes of *Trillium*. *Genetics* 27(1): 169-170. 1942.—An abstract.

8708. THOMPSON, RUFUS H. (U. Kansas.) The effect of light on the polarity of the first vertical division spindle in *Riella affinis*. *Amer. Jour. Bot.* 28(10): 6s-7s. 1941.—An abstract.

8709. WARMKE, H. E. (Carnegie Inst. Washington.) A new method for determining the sex heterozygote in species with morphologically undifferentiated sex chromosomes, and its application to *Silene otites*. *Genetics* 27(1): 174. 1942.—An abstract.

8710. WILSON, G. B., and A. H. SPARROW. (McGill U.) Partial fusion of untreated root tip chromosomes of *Trillium erectum* L. *Genetics* 27(1): 175. 1942.—An abstract.

ANIMAL

8711. BEAMS, H. W. (State U. Iowa), and JOHN FRANCIS SHEEHAN (Creighton U.) The yolk-nucleus complex of the human ovum. *Anat. Rec.* 81(4): 545-555. 2 pl. 1941.—The yolk-nucleus complex is usually located in a juxtanuclear position and is composed of the following elements from the center centrifugally: one and sometimes 2 deeply staining granular centrioles, a clear osmophilic area which is probably comparable to the idiozome of early spermatocytes, yolk nucleus substance of early workers, mitochondria, and Golgi material. As the ovum matures all the elements of the yolk-nucleus complex save for the centrioles and the idiozome-like material gradually become dispersed from the region adjacent to the nucleus. One ovum with the 1st polar body present has been illustrated. Since the nucleus of this ovum was in an interphase stage it seems unlikely that the 2d polar body is formed immediately upon completion of the formation of the 1st.—Auth. (courtesy Wistar Bibl. Serv.).

8712. BHATTACHARYA, D. R., and MURLI DHAR LAL SRIVASTAVA. (Allahabad U.) The yolk nucleus of Balsamian. *Allahabad Univ. Stud.* 1932. *Zool. Sect.* 1-11. 1939.—An attempt is made to sum up existing knowledge con-

cerning the nature and function of the yolk nucleus of Balbiani. The authors believe that the yolk nucleus not only represents the centrosomal area, but also a conc. of Golgi bodies, mitochondria, yolk bodies and vacuome in the early oocyst stages. The area serves as a center of growth and distribution.—C. G. Kadner.

8713. CALLAN, H. G. (John Innes Hort. Inst., Merton, S. W. 19.) Determination of sex in *Scalpellum*. *Nature [London]* 148(3748): 258. 1941.—*S. scalpellum*, a cirripede, is a hermaphrodite with 16 haploid and no sex chromosomes. All larvae are potential hermaphrodites, but only those which become attached to adult hermaphrodites develop as functional ♂♂.—E. D. Crabb.

8714. CASPERSSON, T. Über Eiweißstoffe im Chromosomengerüst. *Naturwiss.* 28: 514-515. 1940.—The absorption spectrum of grasshopper chromosomes [species not stated] was studied by means of a previously described method for spectroscopy in the u.-v. of microscopic objects and photo-elec. measurements of the spectra. A curve is shown of the spectrum (2300-3000 Å) of a metaphase chromosome of a grasshopper. Besides the nucleic acid curve it shows a slight rise at 2800 Å attributed to tyrosine and tryptophan in the protein. Better results are obtained with chromosomes from the salivary gland of Diptera: the presence of 5% tyrosine and 1-2% tryptophan in the protein is claimed. Generally the character of the protein is that of serum globulin. The absorption at wave lengths < 2600 Å is stronger in the linearly arranged chromosome parts (eu- and hetero-chromatic parts) than in the chromocenter. There are indications of more higher-order proteins (globulin type) in the euchromatic sections, more lower-order protein (histone type) in the heterochromatic ones.—B. J. C. van der Hoeven (in *Chem. Abst.*).

8715. FANKHAUSER, GERHARD, and RITA CROTTA. (Princeton U.) The frequency of spontaneous aberrations of chromosome number among larvae of the newt, *Triturus viridescens*. *Genetics* 27(1): 142. 1942.—An abstract.

8716. GATES, R. RUGGLES. Tests of nucleoli and cytoplasmic granules in marine eggs. *Biol. Bull.* 81(2): 298. 1941.—Staining tests applied to the eggs of *Asterias*, *Arbacia*, *Mactra* and *Chaetopterus* showed that lipids are not present in the nucleoli. The nucleoli consists of 2 parts, like immiscible fluids, the one enclosed within the other.

8717. HIBBARD, HOPE. (Oberlin Coll.) The "Golgi apparatus" during development in the stomach of *Gallus domesticus*. *Jour. Morph.* 70(1): 121-142. 7 pl. 1942.—This study includes the cytological differentiation of the gizzard and proventriculus of the chick. The proventricular glands grow by branching of simple sacs into elaborate compound alveolar glands filled with zymogen granules. The gizzard epithelium thickens and columns of cells open into parallel tubular glands which pour a keratinoid secretion to the surface engulfing many cell fragments in the process. Special emphasis is laid on the changes in the Golgi apparatus. This cytoplasmic component is not fat nor lipid, contains no glycogen. It is not keratohyalin, zymogen or mucus although it lies in close association with these secretions. Vital staining with neutral red demonstrates aqueous vacuoles in the precise localities where long impregnation with AgNO_3 or osmic acid has shown conspicuous Golgi nets. The chick material is recommended for general use when demonstrations of the Golgi apparatus are desired.—Auth. (courtesy *Wistar Bibl. Serv.*).

8718. HINTON, TAYLOR. (Columbia U.) A comparative study of certain heterochromatic regions in the mitotic and salivary gland chromosomes of *Drosophila melanogaster*. *Genetics* 27(1): 119-127. 1942.—By analyses of translocations, various regions of the mitotic 2d chromosome of *D. melanogaster* are located on the salivary gland 2d chromosome. The region between the secondary constriction and the centromere on the mitotic chromosome (about $\frac{1}{4}$ of the left arm) is shown not to contribute more than one band to the formation of the salivary gland chromosome. (The secondary constriction of the mitotic chromosome is not differentiated in the salivary gland chromosome.) A similar region is shown to be present in the right arm. Another region is described for the left arm of the mitotic 2d chromosome, adjacent and distal to the constriction, which forms the bulk of the heterochromatin of the salivary gland chromosome. In the light of these data, Bauer's data

(1939) are analyzed and the indications are that breaks due to X-rays in the euchromatin do not occur with the same frequency as those in the heterochromatin.—Taylor Hinton.

8719. HINTON, TAYLOR, and K. C. ATWOOD. (Columbia U.) A comparison of the specificities of terminal adhesions of salivary gland chromosomes in two strains of *Drosophila*. *Genetics* 27(1): 145-146. 1942.—An abstract.

8720. KAYLOR, CORNELIUS T. (Syracuse U.) Studies on experimental haploidy in salamander larvae. II. Cytological studies on androgenetic eggs of *Triturus viridescens*. *Biol. Bull.* 81(3): 402-419. 11 fig. 1941.—Androgenetic eggs of *T. viridescens* most frequently cease development during beginning cleavage, blastula, and gastrula stages. Eggs fixed at cessation of development during irregular beginning cleavage, early and late blastula stages, and the gastrula stage, were sectioned and studied cytologically. The causes of arrested development were found to be: 1) degeneration of sperm nuclei either before or during early mitosis and disappearance of any cleavage furrows, 2) independent irregular division of several sperm nuclei giving rise to the formation of many abnormal mitotic figures and a few irregular cells, 3) irregular division of 1 or 2 sperm nuclei, and development to a late blastula or abortive gastrula with irregular numbers of chromosomes in the majority of cells. These observations confirm Fankhauser's earlier reports on the indispensability of a balanced set of chromosomes to the developing embryo.—C. T. Kaylor.

8721. KOLLER, P. C. (U. Edinburgh, Scotland.) The genetical and mechanical properties of the sex chromosomes. VII. *Apodemus sylvaticus* and *A. hebridensis*. *Jour. Genetics* 41(2/3): 375-389. 9 fig. 1941.—In the field-mice *A. sylvaticus* and *A. hebridensis* $2n=48$ and the ♂ has an XY pair of sex chromosomes, the X being the largest and the Y the smallest of the chromosomes in the complement. The Y is smaller in the latter than in the former sp. At metaphase I in ♂♂ the sex bivalent is always symmetrical. At anaphase I it disjoins symmetrically in *A. hebridensis*; that is, post-reduction is obligatory. In *A. sylvaticus*, the bivalent disjoins symmetrically (post-reduction) in 92% of the cells and asymmetrically (pre-reduction) in 8%. This behavior is attributed to the presence of homologous pairing segments in X and Y located on both sides of the centromere. A chiasma in the shorter region, on the side opposite to the attached differential segment of the X, would lead to pre-reduction; chiasmata in the longer segment, to which the differential segment of the X is attached terminally, or in both segments at once, would lead to post-reduction. In *A. hebridensis* the pairing segment across the centromere from the differential segment of the X is either absent or too short to form chiasmata.—H. B. Glass.

8722. MATTHEY, ROBERT. (U. Lausanne.) Etude biologique et cytologique de *Sago pedo* Pallas (Orthoptères-Tettigoniidae). *Rev. Suisse Zool.* 48(2): 91-141. 4 pl., 17 fig. 1941.—Parthenogenesis occurs normally. Typically the diploid chromosome number is 68 with 12 large V-shaped and 56 small chromosomes. The primary oocyte has the diploid number; the maturation division is heteropolar because of the oblique spindle, equational, and identical with somatic mitosis. Cleavage is precocious the blastoderm being fully formed at laying. Comparison with other Tettigoniidae suggests the sp. and genus as well to be polyploid. Distribution and probable origin of genus and sp. are discussed.—D. S. Farmer.

8723. PERROT, J. L. La fécondation chez *Limax maximus* L. *Rev. Suisse Zool.* 47(19): 371-380. 5 fig. 1940.—A specimen was dissected and the eggs in the various parts of the reproductive system were examined. Those in the oviduct (15), fertilization chamber (49) and terminal portion of hermaphroditic duct (7) had been fertilized. Those in the middle (4) and upper (12) part of the hermaphroditic duct were unfertilized. The hermaphroditic gland contained 6 fertilized ova, 50 unfertilized ova in metaphase of first maturation division, 1300-1500 oocytes in the "germinal vesicle" stage. The question of cross and self-fertilization, direct and indirect, is discussed.—D. S. Farmer.

8724. POLLISTER, A. W., and A. E. MIRSKY. (Columbia U.) Preparation of a nucleohistone from mammalian organs, and direct demonstration of its nuclear origin. *Genetics* 27(1): 160-161. 1942.—An abstract.

8725. RISMAN, G. C. (Brown U.) Cell size in Habrobracon. *Genetics* 27(1): 166. 1942.—An abstract.
 8726. ROSENBLAD, L. E. (U. Houston.) A study of relationship between ventral receptacle and testes coiling in *Drosophila*. *Genetics* 27(1): 167-168. 1942.—An abstract.
 8727. WITHERSPOON, WARD. (Coffeyville Jr. Coll., Kansas.) Spermatid transformation in *Orchelimum nigripes* (De Geer). *Trans. Kansas Acad. Sci.* 44: 434-443. 4 pl. 1941.

—The number of chromosomes found in the *O. nigripes* are haploid number 16-17 and diploid number 33-34. The dictyosomal substance migrates to the nucleus, forming a solid mass going through various stages of vacuolization finally developing into the point of the sperm. The axial filament apparently originates from the central bodies. From it the flagellum of the mature spermatozoon is formed. —Auth. summ.

GENETICS

Editors: ORLAND E. WHITE, Plant; SEWALL WRIGHT, Animal

(See also Entries 8672, 8673, 8675, 8676, 8681, 8685, 8686, 8687, 8688, 8692, 8693, 8695, 8698, 8699, 8702, 8703, 8705, 8708, 8709, 8713, 8718, 8719, 8722, 8725, 8726, 8868, 8870, 8884, 9653, 9655, 9667, 9697, 9698, 9758, 9837, 9902, 9941, 9955, 10442, 10452, 10557, 10578, 10597, 10621, 10675, 10682, 10697, 10700, 10709, 10760, 10764, 10803, 10870, 10890, 10935, 10937, 10944, 10946A, 10949, 10950, 10951, 10954, 10958, 10959, 10965, 10966, 11125, 11186, 11237, 11248)

GENERAL

8728. ZAMENHOF, S. Selective irradiation. *Genetics* 27(1): 176. 1942.—An abstract.

PLANT

8729. ABBE, E. C., and B. O. PHINNEY. (U. Minnesota.) The action of the gene dwarf in the ontogeny of the stem in maize. *Genetics* 27(1): 129. 1942.—An abstract.

8730. ANDES, J. O. (U. Wisconsin.) Experiments on the inheritance of the "plus" and "minus" characters in *Glomerella cingulata*. *Bull. Torrey Bot. Club* 68(9): 609-614. 1941.—Individual ascospores from dark clones of a southern strain produced only dark colonies. Ascii from light clones produced either all dark or 4 dark and 4 light; one exception gave all dark and all light. Ascii developed at the junction of light and dark colonies were similar to those of light except for an occasional 1:3 ratio. Ascii from a northern strain gave either all dark or all light.—J. O. Andes.

8731. ATWOOD, SANFORD S. (U. S. Regional Pasture Res. Lab., State Coll., Pa.) The multiple oppositional alleles causing cross-incompatibility in *Trifolium repens*. *Genetics* 27(1): 129-130. 1942.—An abstract.

8732. BAMFORD, RONALD. (U. Maryland, College Park.) Chromosome number and hybridization in *Gladiolus*. *Jour. Heredity* 32(12): 419-422. Frontispiece, 1 fig. 1941.—A report of successful crosses made between the various spp. and vars. of *Gladiolus*, particularly those with different polyploid numbers of chromosomes. Hybrids can be made between forms representing the limits of the genus, as measured by chromosome number, but the comparative success is less as such limits are reached. Some of the triploids and pentaploids resulting from the above crosses are partially fertile, and aneuploids are produced. Some of these aneuploids also produce progeny. The bearing of this hybridization on the development of the genus is discussed.

—Ronald Bamford.

8733. BAUR, G. Kreuzbefruchtung (Pärchenzüchtung) bei Rotklee in ihrer Bedeutung für die praktische Züchtung. *Zeitschr. Zücht. Reihe A. Pflanzenzücht.* 23(4): 611-637. Illus. 1941.

8734. BEADLE, G. W., and E. L. TATUM. (Stanford U.) Genetics of biochemical characters in *Neurospora*. *Genetics* 27(1): 130-131. 1942.—An abstract.

8735. BEASLEY, J. O. (Agric. Exp. Sta., College Station, Texas.) Meiotic chromosome behavior in species, species hybrids, haploids, and induced polyploids of *Gossypium*. *Genetics* 27(1): 25-54. 1 pl. 1942.—The published cytological data on *Gossypium* hybrids are reviewed. Additional data are given on several hybrids with particular attention given to attenuated bivalents at 1st anaphase, for these bivalents were interpreted to be a result of structural differences between paired chromosomes. Hybrids between some spp. show no evidence of structural differences among their chromosomes, others show structural differences among a few chromosomes, while structural differences appear to exist among all the chromosomes in hybrids between some spp. In haploids from natural allotetraploids a maximum of 5 attenuated bivalents were found. In meiosis of auto-polyploids about $\frac{1}{2}$ of the chromosomes form quadrivalents. In amphidiploids, bridges, univalents, multivalents, or combi-

nations of the 3 are common during meiosis, although some had fewer of these abnormalities than others. *Gossypium* spp. were assigned to 6 groups—the Asiatic, Australian, African, Arabia-India, American 13-chromosome, and American 26-chromosome. The data on the relationships among the groups indicate that 4 of the 5 13-chromosome groups show a closer relationship to the Asiatic group than they have with each other. Since distinct spp. differences exist without corresponding structural differences among the chromosomes, it is concluded that gene changes are more important in initial speciation of *Gossypium* than are detectable structural changes in the chromosomes.—J. O. Beasley.

8736. BEASLEY, J. O., and META SUCHE BROWN. (Texas Agric. Exp. Sta., College Sta.) Asynaptic plants of *Gossypium* and their polyploids. *Genetics* 27(1): 131. 1942.—An abstract.

8737. BERG, S. O. Ueber die Beziehungen zwischen Körnerertrag, Rohprotein gehalt und Rohprotein ertrag verschiedener Weizensorten sowie ihre züchterische Bedeutung. *Zeitschr. Zücht. Reihe A. Pflanzenzücht.* 23(4): 542-561. 1941.

8738. BRINK, R. A., and D. C. COOPER. (U. Wisconsin.) Somatoplasic sterility as a function of the endosperm genotype. *Genetics* 27(1): 134. 1942.—An abstract. Studies with *Nicotiana* are reported.

8739. BRITTINGHAM, WILLIAM H. (U. S. Regional Pasture Res. Lab., State Coll., Pa.) The nature and extent of variation in Kentucky bluegrass [*Poa pratensis*] as criteria for apomictic seed formation. *Genetics* 27(1): 134-135. 1942.—An abstract.

8740. BROWN, W. L. (U. S. Golf Assoc., Washington, D. C.) The cytogenetics of *Poa pratensis*. *Ann. Missouri Bot. Gard.* 28(4): 523-532. 4 pl. 1941.—Both apomixis and amphimixis are prevalent in this species. Apomixis seems to be stimulated by foreign pollen while normal sexual reproduction is stimulated by self-pollination. Within this sp. are a large number of strains, many with different chromosome numbers, forming a euploid series. Different morph. types are often correlated with different chromosome numbers, and a strain can be considerably changed by addition or deletion of one genome. This species may have originated as an allotetraploid, partially apomictic hybrid.—F. R. Fosberg.

8741. BRUMFIELD, R. T. (Yale U.) Cell-lineage studies in root meristems by means of X-ray induced chromosome rearrangements. *Genetics* 27(1): 135. 1942.—An abstract.

8742. CLARK, FRANCES J. (Connecticut Agric. Exp. Sta., New Haven.) Preliminary investigations in *Zea mays* of the germination capacity of pollen with aberrant nuclei. *Genetics* 27(1): 137. 1942.—An abstract.

8743. CULBERTSON, J. O. (U. S. Bur. Pl. Indust.) Inheritance of factors influencing sucrose percentage in *Beta vulgaris*. *Jour. Agric. Res.* 64(3): 153-172. 1942.—Three lines of sugar beets which had been inbred for 2-5 yrs. were used for a study of inheritance of factors influencing sucrose %. Two lines were high in sucrose and one was low. All 3 possible crosses were made and studied in F_1 , F_2 , F_3 , and backcross generations. There was no evidence of maternal inheritance in reciprocal crosses between identical plants.

The av. sucrose % of the F_1 and F_2 generations was approx. equal to the mean of the parents. F_3 progenies and progenies of selfed backcrosses were obtained which were no more variable than the inbred parental lines and which were as high in % sucrose as the higher parent. It appeared that lines relatively homozygous for sucrose % could be obtained with comparative ease. Ability to store sucrose was found to be inherited in a quantitative manner. A significant correlation was found between the sucrose percentage of mother beets selected from segregating populations and the means of their inbred progenies.—J. O. Culbertson.

8744. DODGE, B. O. (New York Bot. Garden.) A heritable factor complex for heterocaryotic vigor in *Neurospora*. *Genetics* 27(1): 140-141. 1942.—An abstract.

8745. FRANDSEN, K. J. Beiträge zur Cyto-Genetik der *Brassica napus* L., der *Brassica campestris* L. und deren Bastards, sowie de amphidiploiden *Brassica napocampestris*. [The cytogenetics of *Brassica*.] *K. Vet.-og Landbohøjskole Aarskr. [Copenhagen]* 1941: 59-90. 1941.—The content of dry substance in *Brassica napocampestris*, a hybrid of *B. napus* and *B. campestris*, reaches 11.3%. The best family of *B. napocampestris* gives 490 hkg. root per ha. The polyploid form of the hybrid requires a longer period of growth. This is possibly the reason for the lower yield (87:100 in proportion to the *B. napus*). Another reason is that the amphidiploid form is more susceptible to attacks of pests than the diploid parents. Through crossing-over in amphidiploids it should be possible to produce better forms. The amphidiploid form is less resistant to frost than the parent forms. The chromosome number for all the investigated *Brassica* forms was found to be $2n=38$ and $n=19$. Among the F_2 plants was found a very great number of amphidiploid plants.—Max Lobedanz.

8746. GILES, N. H., and B. R. NEBEL. (Yale U.) An analysis of the intensity factor in X-ray induced chromosomal aberrations in *Tradescantia*. *Genetics* 27(1): 142-143. 1942.—An abstract.

8747. GÖKGÖL, M. Ueber die Genzentrentheorie und den Ursprung der Weizen. *Zeitschr. Zücht. Reihe A. Pflanzenzücht.* 23(4): 562-578. 1941.

8748. HARLAN, JACK R. (U. California.) The breeding structure of *Bromus carinatus*, Hook. and Arn. *Amer. Jour. Bot.* 28(10): 3s. 1941.—An abstract.

8749. HOLTON, C. S. (Washington Agric. Exp. Sta.) Transgressive inheritance of pathogenicity factors in hybrids between two races of *Tilletia tritici*. *Phytopath.* 32(1): 9. 1942.—An abstract.

8750. JANAKI-AMMAL, E. K. (John Innes Hort. Inst., Merton, Eng.) Intergeneric hybrids of *Saccharum*. *Jour. Genetics* 41(2/3): 217-253. 1941.—The cross *S. spontaneum* var. *Glagah* ($n=56$) \times *Erianthus ravennae* ($n=10+f$) yielded fertile hybrids with 66 chromosomes resembling the sugar-cane parent in most respects. F_2 seedlings were mostly diploids ($S/E+$, $2n=68-76$), but there were also triploids ($SSE-$, $2n=104-108$) and one tetraploid ($SSEE+$, $2n=136$). The *Erianthus* characters segregated in the diploids. Sugar content was greatly lowered, relative to *Saccharum*, in the diploids, only slightly in the polyploids. In the F_1 hybrid, *Saccharum* chromosomes pair by auto-syndesis, with some polyvalents due to pairing with *Erianthus* chromosomes. Meiosis is irregular in F_2 hybrids.—An *S. officinarum* hybrid cane ($2n=106$) crossed with *Imperata cylindrica* ($2n=20$) yielded 35 seedlings of fairly high sucrose content. They were of 4 types: *SS*, $2n=106$, vegetative seedlings; *SS+*, $2n=108-112$, selfed or diploid parthenogenetic, completely sterile seedlings; *SSS*, $2n=156$, triploid selfed, very small, still immature; *SSI*, $2n=120-134$, true hybrids, highly fertile. All but unreduced eggs were eliminated in this cross. *Saccharum* characters predominate in the hybrid; *Imperata* characters segregated out in F_1 .—*S. officinarum* "Vellai" ($2n=80$) crossed with *Ze a mays* ($2n=20+2B$) yielded only 2 seedlings. One died. The other was $2n=52$. The difficulty in making this cross is seemingly that the conc. of sugar required by germinating maize pollen is lower than that found in the *Saccharum* stigma. The hybrid showed some characters of each parental species; in 4 yrs. it has failed to flower. It is propagated from tillers. Long silky hairs on the upper

leaf surface resemble those in the sterile aberrant cane "Troeboe," which may be a hybrid between *Saccharum* and one of the Maydeae.—H. B. Glass.

8751. KEMPTON, J. H., and JOHN W. McLANE. (U. S. Bur. Pl. Indust.) Hybrid vigor and weight of germs in the seeds of maize. *Jour. Agric. Res.* 64(2): 65-80. 1942.—As reported by Sprague, hybrid vigor in maize is often, though not invariably, reflected in dry wt. of resting embryos. Seed groupings based on texture and color of endosperm but with uniform genic backgrounds disclose differences in germ wts. Increased wt. of embryo relative to increased wt. of endosperm offers equivocal evidence on the hypothesis that hybrid vigor results from the interaction of dominant factors favorable for growth.—J. H. Kempston.

8752. KEPPLER, E. Inzuchtleistungen und Bastardierungseffekt beim Radies (*Raphanus sativus*). *Zeitschr. Zücht. Reihe A. Pflanzenzücht.* 23(4): 661-684. Illus. 1941.

8753. KLINKOWSKI, M., und J. HACKBARTH. Zur Kenntnis der züchterischen Bedeutung iberischer Wildformen von *Lupinus luteus* L. und *L. angustifolius* L. *Zeitschr. Zücht. Reihe A. Pflanzenzücht.* 23(4): 579-610. Illus. 1941.

8754. KNIGHT, R. L., and T. W. CLOUSTON. (Empire Cotton Growing Corp.; Sudan Gov.) The genetics of blackarm resistance. II. Classification, on their resistance, of cotton types and strains. III. Inheritance in crosses within the *Gossypium hirsutum* group. *Jour. Genetics* 41(2/3): 391-409. 3 fig. 1941.—160 vars. and strains of cotton have been classified for blackarm (*Bact. malvacearum*) resistance under standardized techniques of growth and inoculation. Complete immunity was found only in some of the Old World types. Virtually all strains of the Peruvian group (*G. barbadense*) and the Bourbon group (*G. purpureascens*) proved fully susceptible. Strains of *G. punctatum* were fully resistant, except for one strain of only medium resistance. The American Upland group (*G. hirsutum*) showed variation from grade 3 (highly resistant) to grade 12 (fully susceptible).—The inheritance of resistance was analysed in three in strains of the latter group. Uganda B.31, of grade 3, carries 2 dominant resistance factors, B_1 and B_2 , plus modifiers. Strain 514 lacks B_1 and B_2 , has minor factors, grades 10. Strain 513, grading 5 to 6, contains factor B_2 and several weak resistance factors, but lacks B_1 .—H. B. Glass.

8755. LINDEGREN, CARL C., and GERTRUDE LINDEGREN. (U. So. California, Los Angeles.) Locally specific patterns of chromatid and chromosome interference in *Neurospora*. *Genetics* 27(1): 1-24. 1942.—Tetrad analysis of the spores from 1575 asci heterozygous for genes closely spaced and marking 4 regions near the centromere shows that chromatid and chromosome interference are distributed in a specific manner among these regions and that methods of calculation based on chromatid analysis cannot predict the expected numbers and types of exchanges. In 2 pairs of regions, symmetrically spaced across the centromere, a larger number of exchanges occurred than were expected and these were predominantly 2-strand exchanges. In 2 other pairs of regions, fewer exchanges occurred than were expected and these few were predominantly 4-strand exchanges.—Authors.

8756. LINDEGREN, CARL C., and GERTRUDE LINDEGREN. (U. So. California.) X-ray and ultra-violet induced mutations in *Neurospora*. *Jour. Heredity* 32(11): 404-412. 2 fig. 1941.—X-ray treatment of the uninucleate spermatia of *N. crassa* induced both gene mutations and chromosomal aberrations, one of which was specifically identified as an inversion; u.-v. treatment induced gene mutations and many of the u.-v. treated variants were degenerate phenotypes which did not yield to genetical analysis. No chromosomal aberrations were found among the u.-v. treated variants. These expts. followed by breeding tests are the first which specifically test induced fungal variants as to their genic and chromosomal nature. In most of the previous abundant work on the induction of mutation in fungi, the source material has not been properly purified, and it has not been possible to distinguish between induced mutations and mutations already present in the stock, or selected by the treatment, as compared to mutations actually induced by the treatment.—C. C. Lindegren.

8757. LINDEGREN, CARL C., and GERTRUDE LINDE-

8758. GREN, (U. So. California.) X-ray and ultra-violet induced mutations in *Neurospora*. II. Ultra-violet mutations. *Jour. Heredity* 32(12): 435-440. 1 fig. 1941.—U.-v. treatment of the uninucleate spermatia of *N. crassa* induced many stable simple gene mutations. None of the u.-v. mutants showed the diminished fertility characteristic of chromosome inversion. Nearly half of the mutants were degenerate phenotypes which did not yield to genetical analysis.—Auth. summ.

8758. LINDEGREN, CARL C. (U. So. California, Los Angeles.) The use of the fungi in modern genetical analysis. *Iowa State Coll. Jour. Sci.* 16(2): 271-290. 1942.—Using *Neurospora* as an example, the various plant structures and the life cycle are described in detail. The principal difference between the fungi and higher plants is the haploid nature of the chromosomes and the commingling of these haploid nuclei which are usually genotypically different in a common cytoplasm. This mixture of genotypically different nuclei has led to some misconception of the variability of the fungi and necessitates a specific procedure and purification. Another factor which has led to some misconception concerning the genetics of the fungi is the apparent failure of the zygote to segregate regularly at meiosis. Genetical analysis with well established mutants shows that regular segregation is the rule in the fungi but a variety of complications can produce apparent but false exceptions to this rule. These complications are studied in detail. The technique of purifying fungi genetically and of clarifying the apparent exceptions to regular segregation are understood. The fungi are shown to be the organisms best adapted to genetical study.—C. C. Lindegren.

8759. LINDSTROM, E. W. (Iowa State Coll.) Inheritance of seed longevity in maize inbreds and hybrids. *Genetics* 27(1): 154. 1942.—An abstract.

8760. LITTLE, THOMAS M., and JEROME H. KANTOR. (Burpee Co., Lompoc, Calif.) Inheritance of earliness of flowering in the sweet pea. *Jour. Heredity* 32(11): 379-383. 1 fig. 1941.—The early-flowering character in Sweet Peas (*Lathyrus odoratus*) is recessive to late flowering. The difference is due to a single pair of alleles.—Auth. summ.

8761. MELCHERS, L. E. (Kansas State Coll.), F. A. WAGNER, and A. E. LOWE. Production of disease-resistant sorghums. *Phytopath.* 32(1): 23. 1942.—An abstract.

8762. NEBEL, B. R. (New York Agric. Exp. Sta.), G. B. WILSON (McGill U.), and L. MARINELLI (Mem. Hosp., New York). X-ray dosage curves in *Tradescantia*. *Genetics* 27(1): 158. 1942.—An abstract.

8763. NEELY, J. WINSTON. (Bur. Pl. Indust., U. S. Dept. Agric.) Inheritance of cluster habit and its linkage relation with anthocyanin pigmentation in upland cotton. *Jour. Agric. Res.* 64(2): 105-117. 1 fig. 1942.—Studies regarding the mode of inheritance of cluster habit in upland cotton verify previous reports that cluster and non-cluster differ by one genetic factor pair. The genes which affect cluster habit and anthocyanin pigmentation belong to the same linkage group; the cross-over value under the conditions of the studies is approx. 18.5—a value that is somewhat higher than previously reported. The application of χ^2 and of maximum likelihood in detecting linkage and in the detection of heterogeneity between different sets of data concerning an estimated cross-over value is discussed in detail and illustrated clearly.—J. W. Neely.

8764. PFEIFFER, NORMA E. (Boyce Thompson Inst.) Recent hybrids of *Lilium sulphureum* \times *L. henryi*. *Amer. Jour. Bot.* 28(10): 5s. 1941.—An abstract.

8765. POPOFF, A. Ueber die Auswuchsneigung des rogen. *Zeitschr. Zücht. Reihe A. Pflanzenzücht.* 23(4): 535-541. Illus. 1941.

8766. POWERS, LeROY. (U. S. Dept. Agric.) The nature of the series of environmental variances and the estimation of the genetic variances and the geometric means in crosses involving species of *Lycopersicon*. *Genetics* 27(1): 162. 1942.—An abstract.

8767. PROPACH, H. (Inst. Genetics, Müncheberg, Mark.) Einige Chromosomenzahlen von *Delphinium* und ihre Auswertung für die Entstehung der Gartenformen. *Gartenbauwiss.* 14(5): 642-650. 1940.—No original data are given. According to parentage one may differentiate between

primary and secondary triploids or tetraploids. The relationship between the orthoploid garden vars. with respect to fertility is such that it must be assumed that the gene make-up of each kind is homologous. All of the chromosome types of *Delphinium* examined show a striking uniformity in morph. structure.—Hans Platenius.

8768. RANDOLPH, L. F. (U. S. Dept. Agric.) The influence of heterozygosis on fertility and vigor in autotetraploid maize. *Genetics* 27(1): 163. 1942.—An abstract.

8769. ROBERTS, LEWIS M. (Yale U.) The effects of translocations on growth in *Zeae mays*. *Genetics* 27(1): 166. 1942.—An abstract.

8770. SANSOME, EVA R., SOPHIA SATINA, and A. F. BLAKESLEE. (Carnegie Inst. Washington.) Crossability between species and between tetraploids and diploids in *Datura*. *Genetics* 27(1): 168. 1942.—An abstract.

8771. SCHNELL, LEONA. (Southwestern Inst. Technol., Weatherford, Okla.) The induction of polyploidy in *Vinca rosea*. *Amer. Jour. Bot.* 28(10): 5s. 1941.—An abstract.

8772. SHULL, GEORGE H. (Princeton U.) *Oenothera* seg. *acuminata*, *Oe.* seg. *contracta*, and other mutational segregations from *Oe. lamarckiana* and *Oe. mut. erythrina*. *Genetics* 27(1): 168-169. 1942.—An abstract.

8773. SMITH, D. C. (U. S. Bur. Pl. Indust.) Intergeneric hybridization of cereals and other grasses. *Jour. Agric. Res.* 64(1): 33-47. 2 pl. 1942.—Efforts were made to hybridize wheat, rye, barley and oats with native and introduced spp. of forage grasses. Hybridization of wheat (*Triticum aestivum*) was attempted with grasses including 15 spp. of *Agropyron*, 7 of *Elymus*, 2 of *Festuca*, *Lolium perenne* and *Secale montanum* as pollen parents. Hybrid plants were obtained only in the following crosses: *T. aestivum* \times *A. elongatum*; *T. aestivum* \times *A. intermediate*; *T. aestivum* \times *A. trichophorum*. Rye vars. (*Secale cereale*) were studied in combinations with 9 spp. of *Agropyron*, 7 of *Elymus* and *Bromus inermis*, *Hordeum bulbosum* and *S. montanum*. The following crosses were successful: *S. cereale* \times *A. repens*, *S. cereale* \times *A. sibiricum*, *S. cereale* \times *A. trichophorum* and *S. cereale* \times *S. montanum*. Five *Agropyron*, 2 *Bromus*, 9 *Elymus* and 4 *Hordeum* spp. and *Festuca idahoensis* and *S. montanum* were used as male parents in crosses with *H. vulgare*. No hybrids were obtained. Limited attempts to hybridize cultivated oats (*Avena sativa* and *A. byzantina*) with other grasses, particularly *Arrhenatherum elatius*, were unsuccessful. Hybrid plants studied have proved to be sterile in all crosses except those derived from *Secale cereale* \times *S. montanum*. Within wheat or rye ♀ parental vars. were not equal in compatibility as evidenced by hybrid seed development.—D. C. Smith.

8774. SMITH, E. GORDON. (U. S. Field Sta., Sacaton, Ariz.) Inheritance of smooth and pitted bolls in Pima cotton. *Jour. Agric. Res.* 64(2): 101-103. 1 fig. 1942.—Pitted and smooth bolls in Pima cotton (*Gossypium barbadense*) are allelic characters. The inheritance, as indicated by segregation in *F*₂ and backcross populations, is monohybrid, with no indication of dominance. Success in analyzing the inheritance of smooth and pitted boll surface may be attributed to similar backgrounds in the 2 strains of cotton utilized in the tests.—E. G. Smith.

8775. SPARROW, A. H., MABEL L. RUTTLE, and B. R. NEBEL. (New York State Agric. Exp. Sta.) Sterility differences between auto- and allotetraploid *Antirrhinum*. *Genetics* 27(1): 170. 1942.—An abstract.

8776. SPENCER, W. P. (Coll. Wooster.) Inherited variations in wild populations of *Claytonia virginica*. *Genetics* 27(1): 170-171. 1942.—An abstract.

8777. STADLER, L. J. (U. S. Dept. Agric.), and FRED M. UBER (U. Missouri). Genetic effects of ultraviolet radiation in maize. IV. Comparison of monochromatic radiations. *Genetics* 27(1): 84-118. 1942.—Mature pollen was irradiated. The effects of 9 wave lengths (2378-3022 Å) were compared in frequency of induced endosperm deficiency. Since the results of wave-length comparisons differ at different levels of dosage, the chief problem is analysis of the dosage relation. The effect of large doses is in general proportionally less than that of small; this is more pronounced at 2536 and 2652 Å than at longer wave-lengths. This is explained in terms of eccentric location of the sperm nucleus and selective effect upon differently oriented pollen grains, due to absorption losses in the penetration of the radiation

through the pollen grain. The position of the nuclei within the pollen grain was detd. and transmission losses in pollen wall and contents measured. The expected modification of a linear dosage curve calculated from these data is in fairly good agreement with the exptl. results. The genetic effectiveness per unit of energy reaching the nucleus at the 9 wave-lengths was proportional to the relative absorption of these wave-lengths by nuclei acid.—*L. J. Stadler.*

8778. VALENTINE, D. H. Variation in *Viola riviniana* Rchb. *New Phytol.* 40(3): 189-209. 2 pl. 1941.—A preliminary account, mainly confined to the spp. as it is known in the British Isles. *V. riviniana* is descr. and its subspp. *nemorosa* and *minor* and the variation in them are discussed. There is also a discussion of the cytology of *V. riviniana*, and of the taxonomy of the species. Ecological, genetical and cytological factors appear to underlie the variation of *V. r.* in Britain. The subspp. *minor* and *nemorosa* are characteristic of 2 distinct types of habitat, "exposed" and "sheltered." The origin of extra chromosomes in the species is not well understood, but an explanation is offered. Genetically, *V. r.* is a species, well marked off, in Great Britain at least, from its close allies; yet within itself, it is heterogeneous. Part of this heterogeneity is accounted for by describing the 2 subspp. as ecotypes, which have evolved by a process of natural selection in 2 different types of environment. The connection of cytological heterogeneity with morphological variation is, as yet, obscure.—*J. R. King.*

8779. WALTERS, JAMES L., and G. LEDYARD STEBBINS, Jr. (*U. California.*) Distribution of structural hybrids in *Paeonia californica*. *Genetics* 27(1): 174. 1942.—An abstract.

8780. WILSON, G. B., and E. R. BOOTHROYD. (*McGill U.*) Differential reactivity in the chromosomes of *Trillium* species. *Genetics* 27(1): 175. 1942.—An abstract.

8781. ZAUMEYER, W. J. (*U. S. Dept. Agric., Bur. Pl. Indust.*) Inheritance of a leaf variegation in beans. *Jour. Agric. Res.* 64(2): 119-127. 1 fig. 1942.—When Corbett Refugee and other vars. that carry the factors for variegation were crossed with normal green plants of several vars., the data obtained supported for the most part the 2-factor Mendelian hypothesis. The F_1 plants of reciprocal crosses were normal green and a ratio of 15 green plants to 1 variegated was obtained in the F_2 . In the F_2 , from green F_1 plants, a 7:4:4 ratio of all green, 15 green to 1 variegated and 3 green to 1 variegated was obtained. The variegated recessive progenies, except in a few instances where the populations were small, did not breed true in the F_2 . This lack of true breeding was probably due to one or several inhibiting factors that suppressed the variegation character. The death of a high % of the variegated plants was probably due to the absence of these inhibitors.—*W. J. Zaumeyer.*

ANIMAL (EXCEPT MAN)

8782. BAKER, MONTEE R., and HEMAN L. IBSEN. (*Kansas State Coll.*) Two modifiers of self (S) and white-spotting (s) in guinea pigs. *Genetics* 27(1): 130. 1942.—An abstract.

8783. BISHOP, D. W. (*U. Pennsylvania.*) Cytological demonstrations of chromosome breaks soon after X-radiation. *Genetics* 27(1): 132. 1942.—An abstract referring to researches with *Chortophaga viridifasciata* and *Melanoplus bivittatus*.

8784. BISHOP, D. W. (*U. Pennsylvania.*) Sensitivity of spermatocyte chromosomes to aberrations induced in the embryos by X-radiation. *Genetics* 27(1): 132-133. 1942.—An abstract referring to studies on grasshoppers (*Circotettix verruculatus*).

8785. BOGART, RALPH, M. E. MUHRER, and A. G. HOGAN. (*U. Missouri.*) The physiology and inheritance of a hemophilia-like abnormality in swine. *Genetics* 27(1): 133. 1942.—An abstract.

8786. BREHME, KATHERINE S. (*Carnegie Inst. Washington.*) A survey of the Malpighian tube color of the eye color mutants of *Drosophila melanogaster*. *Genetics* 27(1): 133. 1942.—An abstract.

8787. BUSHNELL, RALPH J. (*U. Connecticut.*) Incompatible matings in inbred families of the bean weevil [*Acanthoscelides obtectus*]. *Genetics* 27(1): 135-136. 1942.—An abstract.

8788. CALLAN, H. G. (*John Innes Hort. Inst., Merton, Eng.*) The sex-determining mechanism of the earwig, *Forficula auricularia*. *Jour. Genetics* 41(2/3): 349-374. 3 pl., 12 fig. 1941.—*F. auricularia* has 11 pairs of autosomes. In addition ♂♂ have either X_1Y or X_1X_2Y ; ♀♀ are either X_1X_1 , $X_1X_2X_2$, or $X_1X_1X_2X_2$. In the final spermatogonial mitosis, the sex chromosomes become associated by mass pairing. In an X_1X_2Y ♂ complete association yields a triangular or linear trivalent. The Y, which normally segregates from the 2 X 's, is assumed to be dicentric, judging from its shape and behavior at metaphase I and anaphases I and II, and from its fragmentation and non-disjunction during spermatogonial mitoses. Incomplete association of the X_1X_2Y complex also occurs, the univalent Y in such cells being lost with a high frequency. X_1 and X_2 form a bivalent and segregate, thus giving rise to ♂♂ lacking an X_2 chromosome. This chromosome has evidently lost its sex-determining capacity and is superfluous. In *F. scudderii* it has been lost entirely. Different relative numbers of X_1Y and X_1X_2Y ♂♂ in *F. auricularia* may modify the ♂ population adaptively to suit the population density. The X_1X_2Y condition is the sole type found in the closely related genus *Anisolabis*, so is probably the primitive condition for *Forficula*. *Anisolabis* ♀♀ are $X_1X_1X_2X_2$.—*H. B. Glass.*

8789. CASPARI, ERNST. (*Lafayette Coll.*) Genetic and environmental factors influencing testis color in *Ephesia kuhniella*. *Genetics* 27(1): 136. 1942.—An abstract.

8790. CHASE, ELIZABETH BROWN, and HERMAN B. CHASE. (*U. Illinois.*) Inheritance of shape of vaginal orifice in the mouse. *Genetics* 27(1): 136. 1942.—An abstract.

8791. CHASE, HERMAN B. (*U. Illinois.*) A mutation toward normal eyes in the anophthalmic strain of mice. *Genetics* 27(1): 136. 1942.—An abstract.

8792. CLANCY, C. W. (*U. Oregon.*) Development of eye colors in *Drosophila melanogaster*: Further studies on the mutant claret. *Genetics* 27(1): 137. 1942.—An abstract.

8793. COLE, LEON J., and HAROLD E. FINLEY. (*U. Wisconsin.*) The production of somatic mutations in the pigeon with X-rays. *Genetics* 27(1): 138. 1942.—An abstract.

8794. CROUSE, HELEN V. (*U. Missouri.*) Translocations in *Sciara*: Their effect on chromosome behavior and sex determination. *Genetics* 27(1): 138-139. 1942.—An abstract.

8795. CUMLEY, R. W., and M. R. IRWIN. (*U. Wisconsin.*) Interaction of antigens in dove hybrids. Pictorial representation of the relationship of the cellular antigens of two dove species and their hybrids. *Jour. Heredity* 32(12): 429-434. 1 fig. 1941.—This is a pictorial representation of the hypothetical relationship of the cellular antigens of 2 dove species and their hybrids. By means of diagrams, Pearlneck dove (*Streptopelia chinensis*) is shown to possess in its red blood cells an antigen which is not found in those of the F_1 hybrid between Pearlneck and Ring dove (*S. risoria*); the Ring dove is likewise endowed with an antigen not contained in the hybrid. Similarly, the species hybrid is shown diagrammatically to possess an antigenic complex, or "hybrid substance," which is found only in the hybrid, and is not present in either parent. Presumably, the hybrid substance is produced in the cells of the hybrid by the interaction of genes which, in each parent, produce species-specific characters.—*Authors.*

8796. CUMLEY, R. W., M. R. IRWIN, and L. J. COLE. (*U. Wisconsin.*) Genic effects on serum proteins. *Genetics* 27(1): 139. 1942.—An abstract briefly reporting studies on crosses of Pearlneck (*Streptopelia chinensis*) \times Senegal (*S. senegalensis*) doves.

8797. DEMERE, M. (*Carnegie Inst., Cold Spring Harbor, N. Y.*), ALEXANDER HOLLANDER, M. B. HOULAHAN, and M. BISHOP (*Natl. Inst. Health, Bethesda, Md.*) Effect of monochromatic ultraviolet radiation on *Drosophila melanogaster*. *Genetics* 27(1): 139-140. 1942.—An abstract.

8798. DEMERE, M., B. P. KAUFMANN, and E. SUTTON. (*Carnegie Inst. Washington.*) Genetic effects produced by neutrons in *Drosophila melanogaster*. *Genetics* 27(1): 140. 1942.—An abstract.

8799. EATON, ORSON N. (*Bur. Animal Indust., U. S. Dept. Agric., Washington, D. C.*) Crosses between inbred strains of mice. *Jour. Heredity* 32(11): 393-395. 1941.—Results of the mouse crosses agreed very closely with those

between inbred families of guinea pigs as previously reported. Crosses between some strains showed increases over the inbred parent lines in various measures of fertility, viability and growth. Other strains appeared to be incompatible in crosses and gave results inferior to either parent strain. No strong influence of the dam on the young was noted in the mice, as it was in the guinea pig. Combination of 3 inbred strains gave greater increase in the measure of characters studied than the combination of 2 strains. The greatest increase was in measures of fertility and viability. Results in a strain synthesized by crossing the F_2 animals from 2 different F_1 's having a common ♂ parent, point favorably to the possibility of developing a strain with a high % of successful matings and an increase in the number of young born and raised to 120 days.—*Auth. sumn.*

8800. GOOD, C. M. Jr. (*Kansas State Coll.*) The genetics of the grouse locust *Tettigidea parvipennis* Harris. *Trans. Kansas Acad. Sci.* 44: 234-237. 1941.—The inheritance of 19 factors is reported, including 16 color-pattern factors, a factor for long and short wings, a lethal, and the wild type. 10 factors are on 1 pair of chromosomes with no crossing over. Most of the factors reported are dominants. The genetic characters are located on at least 3 of the 6 autosomes. One sexually dimorphic character is present.—*Auth. sumn.*

8801. GOOD, CHARLES M. Jr., and ROBERT K. NABOURS. (*Kansas Agric. Exp. Sta., Manhattan.*) Genetic problems of the grouse locust, *Tettigidea parvipennis* Harris. *Genetics* 27(1): 143. 1942.—An abstract.

8802. GORDON, MYRON. (*New York Zool. Soc.*) Dominant and recessive responses of the *Sd* factor in natural and domesticated fish populations. *Genetics* 27(1): 144. 1942.—An abstract.

8803. GORDON, MYRON. (*New York Zool. Soc.*) A third primary factor, *Sd*, for melanomas in hybrid fishes. *Genetics* 27(1): 144-145. 1942.—An abstract.

8804. GORDON, MYRON. (*New York Aquarium.*) Back to their ancestors. *Jour. Heredity* 32(11): 384-390. 1 fig. 1941.—This is the 3d in a series of papers on The Genetics of *Xiphophorus hellerii*, the Mexican swordtailed fish. When a golden swordtail is mated with an albino, the wild, fully pigmented swordtail is recreated because each var. brings to its offspring the essential dominant factor which the other lacks. This may be expressed as follows: Golden (*stst II*) \times Albino (*StSt ii*) = Wild, olive-green type (*Stst I*). When *Stst II* are inbred these approximate ratios appear: 9 Wild, 3 Golden and 4 Albino.—*Myron Gordon.*

8805. GOWEN, JOHN W. (*Iowa State Coll.*) On the physiological basis of inherited disease resistance. *Genetics* 27(1): 145. 1942.—An abstract. Studies were on mice.

8806. GREEN, EARL L., and MARGARET CREIGHTON GREEN. (*Ohio State U.*) The development of three manifestations of the short ear gene in the mouse. *Jour. Morph.* 70(1): 1-16. 3 pl. 1942.—The short-ear gene in the mouse (*Mus musculus*) is believed to be the genetic agent chiefly responsible for smaller ears, imperfect development of the xiphisternum, and smaller body size. An examination of normal and short-ear individuals in prepartum and post-partum stages shows that the annular cartilages of the ears and the xiphisternums are visibly different in the 2 genetic types by the 14th day, but that the scapular portions of the ears and the body wts. do not diverge until the time of birth. In both ears and xiphisternum, however, the effect of the gene appears to be solely upon processes leading to cartilage formation.—*Auth. (courtesy Wistar Bibl. Serv.)*

8807. GREEN, R. O. (*Quibb Inst.*) An hereditary absence of the incisor teeth. *Jour. Heredity* 32(11): 397-398. 1 fig. 1941.—A ♀ albino rat having no upper or lower incisor teeth was discovered. She was mated with a normal ♂ and none of the offspring showed the defect. In the F_1 , 2 of a litter of 10 animals showed the anomaly. In the backcross mating of an F_1 ♂ to his mother the anomaly was present in 3 of 5 offspring. By mating defective animals in the F_2 a pure strain of rat bearing the tooth defect was obtained. The anomaly is inherited as a mendelian recessive. The molar teeth are abnormal. The incisorless animals were fed a complete diet of mixed ground food.—*R. O. Green.*

8808. HAGER, RUSSELL P. Sex-linkage of stubby (sb) in *Habrobracon*. *Biol. Bull.* 81(2): 298-299. 1941.

8809. HARVEY, ETHEL BROWNE. Maternal inheritance in Echinoderm hybrids. *Biol. Bull.* 81(2): 288. 1941.

8810. HERTEL, ELMER W. (*Wartburg Coll.*) Studies on vigor in the rotifer, *Hydatina senta*. *Genetics* 27(1): 145. 1942.—An abstract.

8811. HOLLANDER, W. F. (*Palmetto Pigeon Plant, Sumter, S. C.*) A sexually dimorphic factor in the pigeon. *Genetics* 27(1): 146. 1942.—An abstract.

8812. HOVANITZ, WILLIAM. (*California Inst. Technol.*) Variable frequencies of a dominant color gene in a wild population. *Genetics* 27(1): 146. 1942.—An abstract. Studies were on *Colias eurytheme* (*Lepidoptera*).

8813. HUESTIS, R. R. (*U. Oregon.*) Gene interaction in *Peromyscus*. *Genetics* 27(1): 146-147. 1942.—An abstract.

8814. HUNT, H. R., C. A. HOPPERT, and W. G. ERWIN. (*Michigan State Coll.*) Heredity in rat caries. *Genetics* 27(1): 147. 1942.—An abstract.

8815. HUTT, F. B., and C. D. MUELLER. (*Cornell U.*) On the linkage relations and manifestation of polydactyly in the fowl. *Genetics* 27(1): 147-148. 1942.—An abstract.

8816. IRWIN, M. R., and R. W. CUMLEY. (*U. Wisconsin.*) Suggestive evidence for duplicate action of genes. *Genetics* 27(1): 148. 1942.—An abstract. Studies on crosses of Pearl-neck (*Streptopelia chinensis*) and Ring doves (*S. risoria*) are briefly reported.

8817. IVES, P. T. (*Amherst Coll.*) Allelism and elimination of lethals in American populations of *Drosophila melanogaster*. *Genetics* 27(1): 148-149. 1942.—An abstract.

8818. JAAP, R. GEORGE. (*Oklahoma Agric. Exp. Sta., Stillwater.*) Modifiers of the sex-linked gene for barred feathers and sex identification in newly hatched chickens. *Genetics* 27(1): 149. 1942.—An abstract.

8819. KAMENOFF, RALPH J. (*City Coll.*) A cytological study of the embryonic livers (16-18 days) of normal and flexed-tailed (anemic) mice. *Genetics* 27(1): 150. 1942.—An abstract.

8820. KAUFMANN, B. P., and M. DEMEREK. (*Carnegie Inst. Washington.*) Sperm utilization in *Drosophila melanogaster* following single and multiple inseminations. *Genetics* 27(1): 150. 1942.—An abstract.

8821. KEELER, C. E., and H. D. KING. (*U. Pennsylvania.*) The taming effect of coat color genes in the Norway rat. *Genetics* 27(1): 151. 1942.—An abstract.

8822. KIMBALL, R. F. (*Johns Hopkins U.*) A gene affecting the manner of swimming in the ciliate protozoan, *Euplotes patella*. *Genetics* 27(1): 151. 1942.—An abstract.

8823. KING, ROBERT L. (*State U. Iowa.*) Inheritance of melanism in *Melanoplus differentialis*. *Genetics* 27(1): 151. 1942.—An abstract.

8824. LAANES, T., and E. C. MacDOWELL. (*Carnegie Inst. Washington.*) Screw-tail, a new mouse mutation. *Genetics* 27(1): 151-152. 1942.—An abstract.

8825. LAMOREUX, W. F., F. B. HUTT, and G. O. HALL. (*Cornell U.*) Genetic selection for low fecundity in the fowl. *Genetics* 27(1): 152. 1942.—An abstract.

8826. LANDAUER, WALTER. (*U. Connecticut.*) A new mutation of fowl affecting the axial skeleton, especially in the tail region. *Genetics* 27(1): 152-153. 1942.—An abstract.

8827. LAWSON, C. A. (*Wittenberg Coll.*) The mechanism controlling production of aphid types. *Genetics* 27(1): 153. 1942.—An abstract.

8828. LEWIS, E. B. (*California Inst. Technol.*) The Star and asteroid loci in *Drosophila melanogaster*. *Genetics* 27(1): 153-154. 1942.—An abstract.

8829. LUCE, WILBUR M. (*U. Illinois.*) Effects of formalin upon facet number in the bar alleles of *Drosophila melanogaster*. *Genetics* 27(1): 154-155. 1942.—An abstract.

8830. McNUTT, C. W. (*Brown U.*), and P. B. SAWIN (*Ohio State U.*) A genetic study of the pattern of the vena cava inferior in the rabbit. *Genetics* 27(1): 156. 1942.—An abstract.

8831. MAINLAND, GORDON B. (*U. Texas.*) The *Drosophila macrospina* group. *Genetics* 27(1): 155. 1942.—An abstract.

8832. MICKEY, GEORGE H. (*Louisiana State U.*) Polysomy and polyploid gametes in *Romalea microptera*. *Genetics* 27(1): 156. 1942.—An abstract.

8833. MULLER, H. J. (*Amherst Coll.*), and G. PONTE-CORVO (*U. Edinburgh.*) Recessive genes causing interspecific sterility and other disharmonies between *Drosophila*

melanogaster and simulans. *Genetics* 27(1): 157. 1942.—An abstract.

8834. MULLER, H. J. (*Amherst Coll.*), and G. PONTE-CORVO (*U. Edinburgh*). The surprisingly high frequency of spontaneous and induced chromosome breakage in *Drosophila*, and its expression through dominant lethals. *Genetics* 27(1): 157-158. 1942.—An abstract.

8835. NEEL, J. V. (*Dartmouth Coll.*) A case of high mutation frequency in *Drosophila melanogaster*. *Genetics* 27(1): 158-159. 1942.—An abstract.

8836. NEWBY, W. W. (*U. Texas*). An intersex in *Drosophila virilis*. *Genetics* 27(1): 159. 1942.—An abstract.

8837. PICTET, A., et A. FERRERO. Hérédité de l'anophthalmie et de malformations oculaires dans la descendance d'un croisement interspécifique de Cobayes. *Rev. Suisse Zool.* 47(13): 209-216. 4 fig. 1940.—An eyeless *Cavia aperea*—*C. cobaya*—hybrid crossed with its normal sisters and daughters resulted in normal-eyed, defective-eyed (unilateral and bilateral), and eyeless (unilateral and bilateral) offspring in such proportions as to lead to a provisional explanation on the basis of the interaction of 3 pairs of factors: *N*, normal with 2 eyes; *P*, defective-eyed with 2 eyes; *A*, eyeless factor causing the absence of 1 or both eyes. *nnPPaa* Individuals are defective-eyed; *nnppAA* individuals are eyeless or with 1 eye.—D. S. Farner.

8839. POWER, MAXWELL E. (*Yale U.*) Neurological effects of mutants reducing facet number in the eyes of *Drosophila melanogaster*. *Genetics* 27(1): 161. 1942.—An abstract.

8840. QUISENBERRY, J. H., and S. O. BROWN. (*Agric. and Mech. Coll. Texas*) Inheritance of an eye anomaly in the albino rat. *Genetics* 27(1): 162-163. 1942.—An abstract.

8841. REED, S. C., L. E. CHADWICK, and C. M. WILLIAMS. (*Harvard U.*) Frequency of wing-beat as a character for separating species, races and geographic varieties of *Drosophila*. *Genetics* 27(1): 163-164. 1942.—An abstract.

8842. RIDDLE, OSCAR, H. H. DUNHAM, and J. P. SCHOOLEY. (*Carnegie Inst. Washington*) Genetic hermaphroditism in a strain of pigeons. *Genetics* 27(1): 165. 1942.—An abstract.

8843. ROBERTSON, G. G. (*Yale U.*) Increased viability of homozygous yellow mouse embryos in new environments. *Genetics* 27(1): 166-167. 1942.—An abstract.

8844. SONNEBORN, T. M. (*Indiana U.*) Inheritance of an environmental effect in *Paramecium aurelia*, variety 1, and its significance. *Genetics* 27(1): 169. 1942.—An abstract.

8845. SPENCER, W. P. (*Coll. Wooster*) Are natural mutations in wild *Drosophila* distributed in a Poisson series? *Genetics* 27(1): 171. 1942.—An abstract.

8846. STEINBERG, ARTHUR G. (*McGill U.*) Further studies on the histological development of the wild type and Bar eyes of *Drosophila melanogaster*. *Genetics* 27(1): 171-172. 1942.—An abstract.

8847. STONE, WILSON S., A. B. GRIFFEN, and J. T.

PATTERSON. (*U. Texas*) *Drosophila montana*, a new species of the virilis group. *Genetics* 27(1): 172. 1942.—An abstract.

8848. STURKIE, PAUL D. (*Alabama Agric. Exp. Sta.*) Suppression of a dominant character, polydactylism, in the domestic fowl. *Genetics* 27(1): 172. 1942.—An abstract.

8849. VILLEE, CLAUDE A. (*U. California*) The effect of cold treatments upon the development of the mutant aristapedia-Bridges in *Drosophila melanogaster*. *Genetics* 27(1): 173. 1942.—An abstract.

8850. WALETZKY, E. (*U. North Carolina*), and R. OWEN (*U. Wisconsin*) A case of inherited partial sterility and embryonic mortality in the rat. *Genetics* 27(1): 173. 1942.—An abstract.

8851. WHITING, ANNA R. (*U. Pennsylvania*) X-ray sensitivity of first meiotic prophase and metaphase in *Habrobracon* eggs. *Genetics* 27(1): 174-175. 1942.—An abstract.

8852. WIGAN, L. G. (*John Innes Hort. Inst., Merton Park, London, S. W. 19.*) Polygenic variability in wild *Drosophila melanogaster*. *Nature [London]* 148(3752): 373-374. 1941.—Polygenic variability is shown to exist in wild populations of *D. melanogaster* trapped in various parts of southern England.—E. D. Crabb.

MAN

8853. BERNSTEIN, MARIANNE E. (*Carnegie Inst. Washington*) The incidence and Mendelian transmission of mid-digital hair in man. *Genetics* 27(1): 131-132. 1942.—An abstract.

8854. CONNON, F. E. (*Stanford U.*) The inheritance of ear pits in six generations of a family. *Jour. Heredity* 32(11): 413-414. 1941.—The occurrence of ear pit (Fistula auris congenita) was studied in 5 generations of descendants of an affected ♀. She was married twice and the anomaly has appeared in descendants of both marriages. Persons of both sexes exhibited pits which were shallow, oval in shape and 1 to 2 mm. in long dia. In all cases the pit was unilateral and with but one exception on the left side. In 1 instance the pit appeared after having skipped a generation. Inheritance of the fistula was, apparently by chance, only through the ♀ parent in every case. Available evidence suggests inheritance of the trait as an irregular or incomplete dominant, supporting previous conclusions regarding the inheritance of ear pits.—F. E. Connon.

8855. OLIVER, C. P., and ROYAL C. GRAY. (*U. Minnesota*) The use of genetic information in the control of hereditary ataxia in a human kinship. *Genetics* 27(1): 159. 1942.—An abstract.

8855A. PIPKIN, ALAN (*Tulane U.*), and SARAH BEDI-CHEK PIPKIN. (*North Texas Agric Coll.*) Albinism in Negroes. *Genetics* 27(1): 159-160. 1942.—An abstract.

8856. RIFE, DAVID C. (*Ohio State U.*) Handedness and dermatoglyphics in twins. *Genetics* 27(1): 164-165. 1942.—An abstract.

BIOMETRY

JOHN W. GOWEN, *Editor*

(See also Entries 8865, 9685, 10291, 10292, 10597, 10648, 10667, 11212)

8857. CHARNLEY, F. (*Dept. Fish., Vancouver*) The variances of the means and the variance of the slope of the line of relation of a linear, composite, bivariate distribution. *Canadian Jour. Res. Sect. A. Phys. Sci.* 20(1): 6-9. 1942.—The variances of the means and the variance of the slope of the line of relation of a linear, composite, bivariate distribution, in which the variances and correlation coefficient of the component populations remain constant, are analogous to the corresponding variances of a linear regression line. The variances of the means are respectively, σ_x^2/N , σ_y^2/N , and the variance of the slope of the line of relation is $S_{xy}^2/N(S_x^2 - \sigma_x^2)$, where σ_x^2 , σ_y^2 are the variances of the component populations, S_{xy}^2 is the vertical variance of the composite distribution around the line of relation, N is the total number of measures, and S_x^2 is the variance of the composite distribution around the Y-axis.—Auth. abst.

8858. FISHER, R. A. The asymptotic approach to

Behrens's integral. *Ann. Eugenics* 11(2): 141-172. 1941.—Confusion and controversy have arisen in respect to the test of significance, first given by Behrens, for the difference between the means of 2 samples not supposedly drawn from equally variable populations, or from populations having a known variance ratio. In such cases not only a single hypothetical variance, but the ratio of 2 such variances, requires to be "Studentized," or eliminated, by means of its fiducial distribution. The first 2 sections of this paper are therefore given to a somewhat fuller examination of the logic of this and analogous inferences than has previously appeared. The analytic difficulties of Behrens's solution make it desirable to use in this case the method of asymptotic approach, which the author had previously published conjointly with "Student" in 1926. By this means expressions for the relevant probability are obtained in terms of powers and products of reciprocals of the 2 degrees

of freedom involved (Table 1). These are then inverted to give, in Table 2, expressions for any chosen percentile point of Behrens' distribution in terms of the corresponding normal deviate. These are alternatively expressed in terms of the cosines of multiples of the angle, the tangent of which is the ratio of the estimated standard deviations of the 2 means. Table 3 gives the numerical coefficients of these cosines for 6 chosen levels of significance, as far as the 4th degree. Table 4 gives the corresponding values at angular intervals of 15 degrees. Tables 5 and 6 are devoted to presenting fuller material for the important case in which one of the means to be compared, being based on a large mass of relatively inaccurate observations, may be taken to be normally distributed with known variance ($n_1=CO$). Table 5 gives the coefficients of inverse powers of n_2 for 6 levels of significance at angular intervals of 5 degrees, while Table 6 gives the significant values at the same 6 levels at intervals of 10 degrees for values of n_2 in the harmonic progression 10, 12, 15, etc. Comparison with the previously published tables of Sukhatmá, obtained by direct numerical integration, shows that the latter are accurate very nearly to the 3d decimal place, but shows, on the whole, a slight positive bias, making the test of significance, but only to a very slight degree, too stringent.—The entries of Table 6 for 0°, which are simply values of "Student's" t supply values at 2 higher levels of significance than have been previously published.—R. A. Fisher.

HUMAN BIOLOGY

(See also Entries Population mathematics, 8861; Respiratory patterns in behavior disorders, 8875; Goal-directed strivings, 8878; Social implications of vitamins, 9241; Alcoholism, 9304, 9456, 9573, 9602, 9621; Cancer incidence in Pittsburgh, 9685; Epilepsy and migraine, 9758; Blood groups, 10027; Venereal dis. control, 10166; Factors in tuberculosis mortality, Chile, 10182; Effects during adult life of primary tuberculosis infection in childhood, 10184; Constitution and predisposition to respiratory disease, 10192)

8862. ANGYAL, ANDRAS. (*Worcester State Hosp., Worcester, Mass.*) Foundations for a science of personality. xii+398p. Commonwealth Fund: New York, 1941. Pr. \$2.25.—Inasmuch as no departmentalized science can, by itself, give a true picture of human beings, there is a need for a new science of man centered around the personality as a whole. This concept of "holism" has certain theoretical consequences which point to new fields of research. The holistic orientation is primarily useful in studies of function. In fact, the science of personality becomes largely the dynamics of a "biosphere" (individual-environmental unit) which includes all processes affected by the "autonomous" (self-regulative) forces of one person. Autonomous forces are strongest at one pole, and "heteronomous" (environmentally regulated) ones at the other. The "tensions" (dynamic relationships between autonomous and heteronomous forces) are organized into systems and are the basic units of biospheric dynamics. The general tendency of the personality is toward the increase of autonomy at the expense of heteronomy, $(a/h)_1 < \rightarrow (a/h)_2$, but this is balanced by a tendency toward "homonomy" (regulation by a social group). These general tendencies of the organism are expressed also in its psychological (symbolic) functions. The study of personality is biological, in the largest sense.—In its general orientation this study carries on a work, the foundation of which was laid down by theoretical biologists such as Ritter, Woodger, Haldane, A. Meyer, Bertalanffy, Uexküll, etc., by exponents of the theory of emergent evolution and by Gestalt psychologists. The book should be useful to biologists because of its unprejudiced attempts to reconcile apparently conflicting concepts in different sciences.—J. P. Scott.

8863. EDWARDS, THOMAS I. (*Nation. Inst. Health.*) Computing scales for calculating percentage deviation from average weight. *Science* 95(2454): 50-51. 1 fig. 1942.—Presents graphic scales (with directions for use) which have been devised to calculate the % by which a man of specified age, height and weight differs in weight from the average of accepted white male life insurance applicants of the same age and height.—M. A. Raines.

8864. FAULKNER, WILLIAM B. Jr. (*St. Mary's and Mary's Help Hosps., San Francisco.*) The effect of the emotions upon diaphragmatic function. *Psychosom. Med.* 3

8859. GREENWOOD, J. A. The significance of a critical ratio (CR). *Jour. Elisha Mitchell Sci. Soc.* 57(2): 209. 1941.—An abstract.

8860. KENDALL, M. G. On the method of maximum likelihood. *Jour. Roy. Statist. Soc.* 103(3): 388-399. 1940.—The author gives, briefly and clearly, the meaning of maximum likelihood and discusses various ways of interpreting it, and the assumption concerning inverse probabilities on which it is, or might be, based. "The populations concerning the parameters to be estimated are supposed to be distributed in such a way that if we follow the principle of maximum likelihood, we shall be right in a greater number of cases." "One of the ways in which the population could be distributed to justify this assumption would be that indicated by Bayes' Postulate."—W. D. Baten.

8861. RHODES, E. C. Population mathematics—III. *Jour. Roy. Statist. Soc.* 103(3): 362-387. 1940.—The author continues his treatment of the relation between the birth and population functions pertaining to ♀. He shows that when one is a polynomial in t , the time, the other is also a polynomial in t ; and that when one is of the form of a logistic curve, so is the other. The author develops a formula for the birth function as a series in terms of the population functions and its derivatives. Very good results are obtained for certain periods when the birth function is a linear function of the population function. The formulas are applied to data from different countries.—W. D. Baten.

(2): 187-189. 1941.—Working with a series of 5 patients the author found, by taking fluoroscopic examinations at the same time that pleasant and unpleasant experiences were suggested, that the entertainment by the patients of pleasant thoughts greatly increased the range of respiratory diaphragmatic movement, while unpleasant thoughts restricted it. These findings support earlier investigations of the author which showed that the suggestion of unpleasant emotions caused narrowing of the esophageal and bronchial lumina while the suggestion of pleasant emotions brought about a prompt relaxation and enlargement of both esophageal and bronchial lumina.—William Galt.

8865. GREBENIK, E. Some aspects of population in Bristol. *Jour. Roy. Statist. Soc.* 103(3): 285-317. 1940.—The author, by constructing life tables for Bristol, England from the census of 1931, calculated the reproduction rates for mothers of various ages for the years 1932 and 1937. The rates are decreasing. From these rates estimated population figures are given for this city from 1942 to the year 2002; these figures show that Bristol will decrease in population from 1942 on. Tables are given showing the decline in the number of school children (ages 5-14), and the percentages of the age distribution for various age groups. These percentages reveal that the number of young people will decline while the number of old people will increase from 1937 on. Various phases of the declining population are discussed among which are population of children of various parity order, average age of mothers for various parities, % distribution of the stable ♀ population, mean parities at various ages, proportions in occupational groups, age of mother and parity order of live-born babies. Problems concerning the future of Bristol, as a city of declining population, are mentioned.—W. D. Baten.

8866. HATHAWAY, S. R. (*U. Minnesota.*) Physiological psychology. xxi+335p. Illus. D. Appleton-Century Co.: New York, 1942. Pr. \$2.75.—This textbook is intended for a basic course in physiology for advanced students in psychology, but parts of it should be useful as collateral reading in general biology and psychology. The presentation is factual rather than theoretical and follows the modern trend toward unification of allied fields. References are omitted, but there is a selected bibliography of 34 titles. There are 44 line diagrams and drawings. Chapter 1 is general, 2 and

3 take up the anatomy of the nervous system, 4-10 cover the functions of various organs as they affect psychological processes (omitting special sense organs but including endocrine glands), and 11-15 describe the physiology of special psychological phenomena such as emotions, speech, intelligence, consciousness, sleep, and motivation.—J. P. Scott.

8867. JAFFE, A. J. (U. S. Census Bur.) Population growth and fertility trends in the United States. *Jour. Heredity* 32(12): 441-445. 1941.—Returns of the 1940 Census population show a 10-yr. rate of increase of only 7.2%, the smallest ever recorded. From an analysis of these returns it is concluded that: 1) under present fertility and mortality conditions the population of this nation will eventually decline by 4% per generation; 2) the rural areas are the only source of future population growth for both the white and nonwhite populations; and 3), the nonwhites because of their greater conc. in rural areas have a higher net reproduction rate than the whites, 107-94.—Author.

8868. KRAUSS, WILLIAM W. Race crossing in Hawaii. *Jour. Heredity* 32(11): 370-378. Frontispiece, 2 fig. 1941.—The results of 6 yrs. of research are summarized. Conclusions are offered on 12 subjects such as mendelian inheritance, the difficulty of determining dominance, physiol. incompatibilities, hybrid vigor, mutation, and intelligence and moral capacities. As a final general conclusion it may be emphasized that the population of Hawaii offers a picture of biological and social contacts between various races and peoples such as large areas of the world will probably present in centuries to come. Opinions are given as to the probable value and future implications of social and biological changes now going on in Hawaii.—L. M. Dickerson.

8869. LEWIS, NOLAN D. C. (N. Y. State Psychiatric Inst.) Personality factors in alcoholic addiction. *Quart. Jour. Stud. Alcohol* 1(1): 21-44. 1940.—The author concludes from a review of the literature that the type of behavior induced by alcohol depends on the constitution of the individual. This "constitution" embraces the total sum of the hereditary and environmental factors involved. 372 references.—H. B. Haag.

8870. STEGGERDA, MORRIS. (Carnegie Inst. Washington, Cold Spring Harbor, N. Y.) Change in hair color with age. *Jour. Heredity* 32(11): 402-403. 1 fig. 1941.—Data on Dutch white children show that head hair becomes darker by almost 1 unit on the Fischer-Saller scale with each year of age for the ages 6 to 18. No significant sex differences were noted.—H. C. Seibert.

8871. VOEGTLIN, WALTER L., FREDERICK LEMERE, WILLIAM R. BROZ, PAUL O'HOLLAREN. (Shadel Sanatorium, Seattle.) Conditioned reflex therapy of chronic alcoholism. IV. A preliminary report on the value of reinforcement. *Quart. Jour. Stud. Alcohol* 2(3): 505-511. 1941.—This is the report of a prelim. survey of the value of the reinforcement procedure in the conditioned reflex treatment of chronic alcoholism. Patients are given a series of single reinforcement treatments at varying intervals of 15 to 90 days during the 1st yr. after the original treatment. The object is to keep the conditioned reflex aversion to alc. from becoming extinct during the 1st critical yr. of ab-

stinence. A survey of the first 197 patients receiving some measure of reinforcement shows that this group hold up better (85% abstinent) than those not receiving reinforcement (70% abstinent) during the 1st yr. after the original treatment. The reinforcement program is worth while even when patients have to be urged to return for their treatments.—Frederick Lemere.

8872. WELLER, HERBERT CLAY. Vegetative rhythm determinative of speech patterns. *Jour. Speech Disorders* 6(4): 161-171. 1941.—100 stutters of both sexes, ages 10 to 30, were studied at various intervals of special training on kymograph records of 10 min. each. Various types of conditioning: counting 1-2-3- etc., by subject and/or operator were used; talking; nonsense syllables. Subjects were allowed to use gesture to aid in getting the rhythms set up. Conclusions were: New breathing rhythms, especially those slower in rate and deeper in inspiration, can be established; such new rhythms have permanency; such re-rhythmatization produces improvement in the speech of stutters, and also improvements in general health and attitude; breathing disturbances of stuttering are more abdominal than thoracic.—M. F. Palmer.

8873. WESTERMAN, KENNETH N. The vibrato, a specific integrational emergence upon fusion of somatic rhythms. *Jour. Speech Disorders* 6(4): 153-160. 1941.—54 subjects chosen at random from various educational groups and from the upper 50% of intelligence in those groups were studied with the oscillograph. Instructions were given in clear tone and posture. (Elevating chest, hum-ming m.) Prior to instruction 6 had vibrato, 33 had irregular vibrato, 15 had no vibrato. After instruction 46 had regular v., 6 irregular vibrato, 2 questionable. Amplitude vibrato is the result of fixation of back, neck, shoulder girdle, and thoracic cage, with minimal activity of diaphragm and abdominal musculatures. Pitch vibrato occurs as result of fixation of larynx and adjunctive musculatures, allowing minimal activity of phonating system. Complexity vibrato is the result of fixation of the head and jaw, pharynx, naso-pharynx, and fauces, with balanced flexibility of lips, tongue, and soft palate. Artistic vibrato is the result of the delicate balance of the gross structures of posture and respiration against the small muscles of the larynx, pharynx, jaw, palate, tongue and lips.—M. F. Palmer.

8874. ZURUKZOGLU, S. Rückgang der Alkoholschäden in der Schweiz. *Gesundheit. u. Wohlfahrt* 21: 81-83. 1941.—There has been a substantial reduction in the amt. of alcohol consumed in Switzerland in terms of abs. alc., while at the same time a smaller portion of the alc. consumed is in the form of high proof beverages. This is attributed to the legislation of 1930-32 regulating the production of distilled spirits. Figures of admissions in selected large hospitals show a decrease in cases of alcoholic psychoses, delirium tremens, and Korsakoff's psychosis, while admissions for chronic alcoholism have not distinctly fallen. Deaths in which delirium tremens was the primary cause have decreased by more than 50%.—Courtesy *Quart. Jour. Stud. Alcohol*.

ANIMAL BEHAVIOR

(See also Entries *Ptinus* (beetle), 8887; Climate and activity of fox squirrel, 8908; Photoperiod and activity and hibernation of dog tick, 8913; Eating of hard seeds instead of grit by birds, 8973; Learning in *Sepia*, 9533; Rage reactions in decorticate cats, 9536; Taste of denatured sugars, 9856; Breed differences in dogs, 9945; Host-seeking by entomophagous insects, 11064; *Micromalthus* (Coleopt.), 11197; Chironomid larva in aquatic plants, 11206; Nesting habit of ant, 11247; Founding ant colonies, 11248; Swarming of wasps, 11252; Earwig, 11276; Fishing by Cormorants, 11336; Belligerency of Kingbird, 11361; Roosting habits of birds, 11366; Host-finding by parasitic birds, 11383; Photoperiod and molt in birds, 11393; Territories, Albatross, 11404; Nesting of waterfowl, 11407; "Fear hypnosis" in birds, 11451; Courtship and display among birds, 11453; Pecking order, sparrows, 11467; Roosting time of birds, 11472; *Rhesus* monkey, 11481)

8875. BURROW, T. (*Lijwynn Found.*, New York.) Kymograph records of neuromuscular (respiratory) patterns in relation to behavior disorders. *Psychosom. Med.* 3(2): 174-186. 1941.—The author reviews briefly the pioneer studies of himself and his associates in group- or phylo-analysis. As a result of the consistent frustration of the "affectional-symbolic" or "partitive" behavior orientation in the group-analytic setting, a new type of attention or interest was brought to awareness. This is called "cotention" and is to

be distinguished from the customary process of attention. The psychological counterpart of cotention is an environmental rapport that is uninterrupted by affect-images or preoccupations. The present investigation deals with certain neuromuscular and respiratory alterations which occur in the cotentive reaction. There is a marked diminution in number of eye-movements and in respiratory rate during cotention. The min.vol. of air respired in cotention is also markedly reduced, while the oxygen-utilization (the %

of O_2 utilized by the lungs) is considerably increased. The prerequisites and instructions for attaining the cotentive response are given and there is a discussion of its therapeutic and social significance. The study has made "a beginning of separating en masse the neuromuscular pattern of reaction which motivates the organism's wishful or deviate behavior from the neuromuscular pattern of reaction which as a total mass or configuration insures the organism's consistent motivation in relation to the actual environment."—William Galt.

8876. DAVIS, DAVID E., and L. V. DOMM. (U. Chicago.) The sexual behavior of hormonally treated domestic fowl. *Proc. Soc. Exp. Biol. and Med.* 48(3): 667-669. 1941.—Since the injn. of hormones makes possible segregation of certain behavior patterns, a series of injns. was undertaken on domestic fowl to investigate the endocrine factors concerned in behavior. Capons received testosterone propionate, estradiol, or stilbestrol. Bilaterally and sinistrally ovariectomized poulards received testosterone or estradiol. Roosters received stilbestrol. The behavior was tested by introducing a rooster, hen, or a stuffed hen, mounted in the copulatory position. Two capons, receiving 2.50 and 3.75 mg. of testosterone daily, copulated, crowded, and waltzed within 2 weeks. A 3d very nervous capon, receiving 1.25 mg., never copulated. 3 capons, receiving 0.5, 1, and 1.5 mg. estradiol, copulated in 18 days. Another series receiving 1, 1.5, and 2 mg. estradiol, copulated within a week. Two capons receiving 1.5 and 2 mg. stilbestrol copulated. A 3d very nervous bird, receiving 1 mg., never copulated. Capons receiving estrogen never crowded and rarely waltzed. Two roosters receiving 2.5 and 5 mg. stilbestrol ceased crowing but continued to copulate, although the testes regressed very noticeably. Three bilaterally and 3 sinistrally ovariectomized poulards receiving 1.25, 2.5, and 3.75 mg. testosterone crowded and waltzed in 3 weeks but never copulated. Two bilaterals receiving 0.5 and 1 mg. estradiol squatted and received copulation from a rooster. A 3d bilateral receiving 1.5 mg. estradiol, although seemingly unresponsive, received several copulations. These expts. indicate that in capons, copulation is induced by androgen and estrogen and that in poulards, squatting is induced by estrogens. Crowing, waltzing, and tidbitting are controlled by androgen in both sexes.—Authors.

8877. DOMM, L. V., and DAVID E. DAVIS. (U. Chicago.) Sexual behavior of intersexual domestic fowl. *Proc. Soc. Exp. Biol. and Med.* 48(3): 665-667. 1941.—The behavior of intersexual domestic fowl, produced by injn. of estrogens into eggs, was examined by introducing the bird to a rooster, hen, or a stuffed hen mounted in the copulatory position. Males are variously feminized, but ♀♀ are essentially normal. Groups of 5-9 individuals of both sexes were kept in large pens. The individuals were classified arbitrarily by plumage into 4 classes, the first essentially normal ♂ and the 4th essentially normal ♀. Observations on peck order showed a social hierarchy, with the most masculine ♂♂ at the top and the most feminine at the bottom. The normal rooster waltzes to induce a newcomer to indicate its sex. If the newcomer is a receptive ♀ it squats for copulation. If it is a ♂, it raises the neck hackle, thereby beginning a fight. The behavior of intersexual ♂♂ shows gradations from perfect masculine behavior patterns to definitely neutral, inactive behavior. The behavior preliminary to copulation is divided into several successive stages, each recapitulating the previous ones: (1) lowered wing, (2) waltz and stop, (3) waltz and circle, (4) waltz and grab, and (5) copulation. In general birds of plumage class IV (most feminine) seldom went beyond stage (1). Birds of class III seldom went beyond stage (3). Birds of class II commonly performed action (4). Birds of class I copulated occasionally. Fertile copulations were found only in some class I individuals. The intersexual birds reacted to the dummy in the same manner, but on a lower level of activity. [See preceding abst.]—Authors.

8878. FRENCH, THOMAS M. (Inst. Psychoanalysis, Chicago.) Goal, mechanism and integrative field. *Psychosom. Med.* 3(3): 226-252. 1941.—The author presents a conceptual picture of "the dynamic relationships between a biological need and the integrative field of a goal-directed striving derived from it and between this integrative field and subsidiary mechanisms." He outlines an analysis of the internal dynamic organization necessary for the success of

goal-directed strivings and relates the application of his hypothesis to specific problems that present themselves in psychoanalytic experience.—William Galt.

8879. HELLMER, LEO A. (U. Kansas.) The effect of temperature on the behavior of the white rat. *Trans. Kansas Acad. Sci.* 44: 352-353. 1941.

8880. HUMPHREY, G., and FRED MARCUSE. (Queen's U.) Factors influencing the susceptibility of albino rats to convulsive attacks under intense auditory stimulation. *Jour. Comp. Psychol.* 32(2): 285-306. 5 fig. 1941.—White rats were stimulated by the sound of an electric bell while housed in a small cage. Convulsive attacks were produced in a variable number of animals and in variable frequency. Susceptibility to convulsions is increased by training in a conflict maze situation using the Warner-Warden maze. Handling, continued repetition of the stimulus, and running as in an activity wheel decreased the number of convulsions. Intensity of stimulation increased attacks. Some of the difference in susceptibility seemed referable to constitutional factors.—C. W. Brown.

8881. MATTTHES, E. Olfacto e gosto no reino animal. [Smell and taste in the animal kingdom.] *Arg. Mus. Bocage* 9: 17-46. 1938.

8882. MERKER, E. [The light sensitivity and light sense of animals.] *Naturwiss.* 28: 623-628. 1940.—A review with references.—B. J. C. van der Hoeven (in Chem. Abst.).

8883. MOEHRES, FRANZ PETER. (U. Köln.) Untersuchungen über die Frage der Wahrnehmung von Druckunterschieden des Mediums (Versuche an Bodenfischen). *Zeitschr. Vergleich. Physiol.* 28(1): 1-42. 1940.—Groundlings (*Gobio fluviatilis*) were subjected to controlled light, contact, and pressure conditions. Light preference and positional preference were detd. solely by the animal's position in the tanks. The "gas-release reflex" (Gasspucktreflex) was used as an indicator of changed pressure conditions. Groundlings were shown to be positively thigmotactic and negatively phototactic. The "gas-release reflex" indicates a high susceptibility to change in hydrostatic pressure. Like other Physostoma, the swallowing and release of air is a common phenomenon. Gas secretion also occurs in the swim bladder. Cutting the pars superior of the labyrinth has a temporary effect, cutting the pars inferior a lasting effect, in reducing the susceptibility to pressure differences.—L. W. Holm.

8884. STRESEMANN, E. Zeitpunkt und Verlauf der Mauser bei einigen Entenarten. *Jour. Ornithologie* 88: 283-333. 1940.—An interesting discussion of the normal course of the molt and also of expts. The ♂ has 4 plumages: down, juvenal, breeding (Prachtkleid), eclipse. The ♀ has 4: down, juvenal, breeding (Brutkleid), resting plumage (Ruhekleid). The molt into the eclipse is not dependent on definite regression of testes; it apparently depends on the hypophysis. Perhaps a hormone keeps the ♀ in henny plumage all the year, the ♂ part of the year. The bright plumage of the ♂ brings the sexes together and draws attention of enemies away from the ♀ and brood. The bright plumage (Prachtkleid) is neutral since it is attained when the gonads are regressed. Cavazza (1938, Arch. d'Anat. Microsc., 31: 145-270) found that both sexes assume it after castration. The eclipse lasts only 3-5 weeks; all the primaries are lost as soon as this plumage is attained. The author says that if the Black Duck (*Anas rubripes*) molts but once, then we can conclude that the double molt is an acquired characteristic of the Anatidae which came as a consequence of increasing sex dimorphism; but if it molts twice, then it would seem that the primary reason was renewal of worn feathers. Black Ducks have an eclipse plumage, the drakes assuming it in late May and June. Tropical ducks molt but once a year, even if dimorphism is striking. Hybrids between ducks molting once and those molting twice have 2 molts (Heinroth, 1911). ♀♀ molt twice, but usually carry the resting plumage till spring and have a fresh plumage before they nest. There are 2 conditions in birds in the determination of plumages: in one both sexes possess the same inherited predisposition (Erbanlage) for feather coloring; the difference depends on hormones; in the other the inherited predisposition for the ♀ lies in the heterochromosome; here there is a genetic ♂ plumage and genetic ♀ plumage, as in the House Sparrow (Keck, 1934).—M. M. Nice (in Bird-banding).

ECOLOGY

Editors

ORLANDO PARK, *General Animal Ecology*
 G. D. FULLER, *General Plant Ecology*
 CHANCEY JUDAY, *Hydrobiology (Oceanography, Limnology)*

FREDERICK A. DAVIDSON, *Ecology of Wildlife Management—Aquatic*
 W. L. McATEE, *Ecology of Wildlife Management—Terrestrial*

ROBERT G. STONE, *Bioclimatology, Biometeorology*

(Other entries in this issue: [GENERAL AND ANIMAL ECOLOGY]—Gulf of California, 8633; Polydora (Annelid) attacking oysters, 8966; Rainfall and partridge abundance, 8978; Deer in Allegany Park, New York State, 8999; Population dynamics, ringneck pheasant, 9003; Hare census, 9006; Viability of fungous spores after passage through digestive tract of beetles, 11015; Temp. as affecting hibernation in sawflies, 11057; Diapause in sawflies, 11058; Forest tent caterpillar, 11060; Land mollusks, 11163; Crab, 11182; Chironomid larva in aquatic plants, 11206; Luminosity and spider-like habits in fly, 11207; Parthenogenesis in Cynipid, 11243; Fungus-growing ant, 11244; Nesting habit of ant, 11247; Founding ant colonies, 11248; Swarming of wasps, 11252; Earwig, 11276; Antiquity of fossil insects, 11281; Life-zones of Oregon reptiles, 11317; Cormorants, 11336; Census of Emberiza (Aves), 11358; Range extension in birds, 11403; Albatross, 11404; Rivers as barriers to gibbons, 11491. [PLANT ECOLOGY]—Breeding structure of brome grass, 8748; Contouring and rainfall, 8890; Algae, 10370; Terrestrial algae, 10382; Antibiosis in fungi, 10407; Myxomycete-bacterium associations, 10427; Myxomycetes, 10429; Cladium, 10472; Stanleya (Crucif.) and seleniferous soils, 10520; Vegetation of the Ukraine, 10540; Erosion control in western states (U. S. A.), 10588, 10592, 10595, 10633; Crop rotation, 10596; Reproduction in Pinus spp., China, 10756; Allelocatalytic effect in pollen-tube growth, 10803; Criteria of drought resistance, 10829; Spruce sawfly and Gaspe forests, 11056)

GENERAL

8885. RIEGEL, ANDREW. (*Fort Hays Kansas State Coll.*) Some coactions of rabbits and rodents with cactus. *Trans. Kansas Acad. Sci.* 44: 96-103. 5 fig. 1941.—The dissemination of prickly pear (*Opuntia humifusa*) seed by jackrabbits (*Lepus californicus melanotis*) as a result of eating the fruits of the plants, and the planting of the seed by ground squirrels in satisfying their food-storing habit, are the principal means by which seed of this cactus is scattered in this part of Kansas. The using of the seed for food by the rodents acts as a check on the increase of cactus by growth from seed. Ground squirrels remove cactus seed from fecal pellets of rabbits, further reducing the chances of increasing cactus from seedling production.—Author.

BIOCLIMATOLOGY, BIOMETEOROLOGY

(Other entries in this issue: Temp. affecting behavior, rat, 8879; Desiccation and temp. as controlling distr. of gastropods, 8905; Climate and activity of fox squirrel, 8908; Photoperiod and activity and hibernation of dog tick, 8913; Forest litter and soil temp., 8930; Solubility of O₂ in water, 8957; Fish movement in fishways, 8965; Rainfall and partridge abundance, 8979; Blood volume changes due to hot temps., 9162; Env. temps. and infertility of hens' eggs, 9906; Humidity affecting efficacy of aerosols, 10129; Weather, climate, and resistance to disease, 10018A; High alt. and agglutinin production, 10193; Distr. of soil legume bacteria in Nebraska, 10270; Rainfall, temp., and quality of wheat, 10587; Seasonal temps., and crop yields, 10596; Rainfall and pasture composition, 10601, and pasture yields, 10602, and pasture composition, Virginia, 10627; Light intensity as affecting fruiting of potato plant, 10644; Rock weathering and soil-profile development, Hawaii, 10652; Climate as affecting peach and nectarine production, California, 10669; Climate and fruit production, S. Africa, 10670; Evaporimeter as gauge of water use, citrus, 10689; Root temp. and humidity as affecting transpiration by strawberries, 10695; Soil moisture as

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8886. BAIR, ROY A. (*Iowa State Coll.*) Climatological measurements for use in the prediction of maize yield. *Ecology* 23(1): 79-88. 1942.—Records of weather taken within exptl. maize plots were compared with determinations made a few hundred ft. distant at an unprotected location in order to evaluate the extent to which Weather Bureau data could be substituted for field-plot determinations. 3 daily psychrometric readings at the exposed location provided weekly means which gave a correlation coefficient with evaporation (field atmometers) of -0.95 after the maize plants were high enough to shade the atmometers and retard wind movement. While rel. humidity accounted for 91% of the variability in evaporation, the regression of evaporation on both humidity and wind raised this figure to only 93%. Soil

temps. averaged 4°-8° F higher at 6-in. depth in the open than under maize plants, and the lower, wetter part of the field used in 1938 was cooler than the higher, drier soil. The alteration of wind movement, atmometer evaporation, soil temp., and soil moisture by the plant cover renders measurements of these factors made outside of the field of little use in attempts to estimate growth and yield of maize. Weekly means of rel. humidity and of air temp. are so little modified by the maize plant cover that weather station records are probably applicable to

factor conditions in maize fields for a radius of several miles.—*R. A. Bair.*

8887. BENTLEY, E. W., D. L. GUNN, and D. W. EWER. (U. Birmingham.) The biology and behavior of *Ptinus tectus* Boie. (Coleoptera, Ptinidae), a pest of stored products. I. The daily rhythm of locomotory activity, especially in relation to light and temperature. *Jour. Exp. Biol.* 18 (2): 182-195. 1941.—Animals were cultured at 25°C and a rel. humidity of 70-80% on whole-meal flour with dried brewer's yeast, with access to wet cotton. Expts. were done under controlled humidity and without food. Animals cultured in alternating light (20-30 meter-candles) and darkness (0.3-1.2 m.c.) at 25°C for 10 days showed a diurnal rhythm of locomotory activity (% of animals moving at an instant, observed each 15 min.), with max. in the dark period (a major peak at dusk, minor at dawn). Changing to continuous light blurred the rhythm in a few days. Reversing the conditions for 3 weeks reversed the rhythm, after which changing to continuous light blurred the reversed rhythm in a few days, while the dulled maxima advanced toward their original normal positions. Animals cultured for some months in continuous light at 25°C showed no diurnal rhythm, but one cycle of alternating illumination initiated the rhythm. In alternating (natural) light and darkness, and fluctuating lower temp. (10°-20°C), *Ptinus* showed greater activity than at 25°, with maxima in the cold, dark periods. Animals in constant light and naturally fluctuating temp. (17°-23°) for >3 weeks showed rhythmic activity, maximal during falling temp., which persisted for a few days after changing to constant temp. Food during the expt. reduced the general level of activity.—*C. V. Winder.*

8888. BLISS, DONALD E., D. C. MOORE, and C. E. BREAM. (U. California Citrus Exp. Sta.) Air and soil temperatures in a California date garden. *Soil Sci.* 53(1): 55-64. 4 fig. 1942.—Data on the weekly mean temps. of air and soil within the U. S. Date Garden at Indio, California, from Sept., 1934, to Jan., 1939, are presented. The temps. of the air and those of the soil at 1- and 3-ft. depths were recorded continuously by thermographs, and weekly mean temps. were calculated from the thermograph charts by means of a planimeter. Temps. of soil at depths of 4, 6, 7½, and 8 ft. were determined weekly on standard thermometers. Wide seasonal variations in weekly mean air temps. were found. During the summer the temps. of the air were considerably higher than those of the soil at a depth of 1 foot. The large date palms which surrounded the instruments had a tempering effect on the air temps. within the date garden, but the mean weekly air temps. were almost identical with those at a near-by meteorological station located in the open. Overturns in the temp. of the soil at different depths occurred regularly in the fall and spring of each yr. The yearly range of air temps. was considerably greater than that of soil at a depth of 1 ft.; the yearly range of soil temps. diminished with increasing depth of soil.—*Auth. summ.*

8889. GUERNSEY, J. E. (Clark U.) A climatic map of Jamaica on the Köppen system. *Bull. Amer. Meteorol. Soc.* 22(8): 327-331. 3 maps. 1941.—A climatic map of Jamaica based on the Köppen system is developed. The map is built from the analysis of 271 rainfall gauges with records of 10 to 70 yrs. and 4 temp. records of 10 to 30 yrs. In general the A types dominate the map. The effect of the island topography and the general circulation on the climatic zones is discussed as well as the problem of year-climates.—*Frederick Sargent.*

8890. HARROLD, L. L. Rains on the plains. *Soil Conserv. U. S. Dept. Agric.* 7(3): 85. 1941.—During the June 1941 rain of approx. 6 inches at the Central Great Plains exptl. watershed contour cultivation averaged 0.8 inch less runoff than straight rows.—*Eric Winters.*

8891. MÄDE, A. (Agrarmeteorol. Inst., Müncheberg, Mark.) Über den Temperaturgang in Gewächshäusern, Dunkelkästen und Mistbeetanlagen. *Gartenbauwiss.* 14(5): 626-641. 1940.—Continuous records showed that the curves obtained for temp. and humidity changes during a 24-hr. period follow the same trend regardless of whether the records are taken in the greenhouse, shade house, hotbed or in the open air. The main factor causing diurnal fluctuations is radiation.—*Hans Platenius.*

8892. MILLIGAN, JAMES W. (U. S. Weather Bur., Washington.) Mathematical analysis of the significant factors in the hygrometric forecasting equation for Florida minimum temperatures. *Bull. Amer. Meteorol. Soc.* 22(10): 385-389. 1941.—1:30 P.M. observational data, the dewpoint temp. and the max. soil depth temp. at the 6-inch level, collected during the winter seasons of 1939-40 and 1940-41 (38 days included) at the Everglades Expt. Station in Belle Glade, Florida, were used to post-predict the minimum temp. of a thermometer exposed in the standard way 1½ ft. above the ground. The observations were made on a special exptl. plot where the water table was kept constant at 1½ ft. below the bare muck surface. The dewpoint temp. was correlated with the max. soil-depth temp. minus the min. temp. The product moment correlation coefficient was 0.661 ± 0.008 . A linear regression line ($y = -35.26 + 0.327(D)$ where "D" is the dewpoint temp and "y" is the min. temp.) was calculated from the data and used to post-predict the minimum temp. The av. error between the calculated and the observed minimum temp. was 2.35° F.—*Frederick Sargent.*

8893. MOORE, KENNETH. (U. Kansas.) Scientific attitudes in relation to climatic fluctuations. *Trans. Kansas Acad. Sci.* 44: 366-368. 1941.—Summary and extension of R. H. Wheeler's studies of culture and climate correlations. The past climatic history worked out by Wheeler was correlated with George Sarton's list of scientists and the ratio of organismic to mechanistic workers was found to be 1.1:1 during warm periods, and ratio of "mechanistic" to "organismic" workers was 4.6:1 during cold periods. 81.7% of the "grammarians" came within the cold periods, 81.7% of the "neo-platonists" came within the warm periods. Political scientists listed by Sabine were also correlated: 91.3% of the "organismic" men came in warm times and 84.1% of the "mechanistic" men came in cold times. The corr. coeff. r for warm climates and "organismic tendencies" was $+0.33 \pm 0.026$ crit. ratio 2.9; r for cold climates and "mechanistic tendencies" was $+0.62 \pm 0.018$ crit. ratio 1.1.—*R. G. Stone.*

8894. MOSHKOVA, G. G. The effect of new observation hours in the study of the wind regime. *Meteorologia i Hydrologia* [Moscow] 1939: 95-98. 1939.—Frequently a change in the hour of observation, or a change in the number of observations is made at a station, and the question arises as to the effect of such a change on the "established" regime of the observed element. To gain the answer in the specific case of a 2-hr. change in one of the observation hrs. of wind at Tashkent (USSR) and the addition of a new observation hr., the author compared the tabulated values of wind direction and velocities taken at the observation hrs. of 7, 13, 21, representing the "old" hrs., with the values obtained at the observation hrs. of 1, 7, 13, 19, representing a change in one of the "old" hrs. (21) and an addition of a new observation hr. The comparison was made possible through a continuation over a 6-yr. period of an extra observation hour (21). The results given in form of graphs and tables show that the changes in the observation hrs. brought about practically no change in the wind distribution except in so far as a somewhat greater number of "calm" periods was recorded under the new system. From this, the author concludes that as far as the Tashkent region is concerned a change in the hrs. of observations has practically no effect on the observed wind regime.—*I. I. Schell.*

8895. NEUBERGER, HANS H. (Pennsylvania State Coll.) The influence of the snow cover on the position of Arago's neutral point. *Bull. Amer. Meteorol. Soc.* 22(9): 348-351. 1941.—Under symmetrical light conditions the optical modification produced by a snow surface decreases the antisolar distance of Arago's neutral point. Therefore, for investigations of the atmospheric turbidity by means of observations of Arago's point this effect must be taken into consideration.—*Auth. summ.*

8896. NISHINA, Y., Y. SEKIDO, H. SIMAMURA, and H. ARAKAWA. Cosmic ray intensities and air masses. *Bull. Amer. Meteorol. Soc.* 22(9): 367-368. 1941.—(Article reprinted from *The Physical Review*, 1940, 57: 633.) The data were obtained in Tokyo in 1937. Both the correlation coefficient and the barometric coefficient are relatively high in the fresh P_c air mass, and T_m air mass, and show a gradual decrease as the air mass type modifies. The correla-

tion coefficient and the barometric coefficient are very low in Pm air mass, which is shallow and overrun by Tm air mass. The reduced (corrected to 755 mm. pressure) cosmic ray intensity is relatively low in warm air (Tm and Pm), but is high in cold air (Pc).—Frederick Sargent.

8897. PARDUE, LEONARD G. Jr. (U. S. Weather Bur., Lakeland, Fla.) Experimental data on the freezing of plants at the Lakeland Meteorological Laboratory. *Bull. Amer. Meteorol. Soc.* 22(10): 383-385. 1941.—The critical temp. for permanent damage by freezing to truck plants was investigated during the winter season of 1941 by exposing plants and properly ventilated thermometers on various platforms of a 43-foot tower placed in a low-land pocket. Notes were kept as to the character, amt., and location of frost deposits. Damage was ascertained by the afternoon of the same day on which the damage occurred. The extent of damage was estimated from the % of wilted leaves on the plants. A total of 48 pepper and tomato plants were exposed during the expt. No damage was suffered by plants at temps. above 30° F. Killing began at about 28° F. Frost damage occurred whether the frost deposit was melted before sunrise by the rising morning temp. or by the sun's heat.—Frederick Sargent.

8898. SALOHEIMO, LAURI. (Karelska Exp. Sta., Finland.) Väderleksförhållanden vid Finska Mosskulturföreningens försöksstationer år 1939: II. Karelska försöksstationen. [Weather conditions at the expt. stations of the Finnish Bog-Cultivation Society for 1939. II. Karelska Expt. Station.] *Finska Mosskulturfören. Årsbok* 44: 49-55. 1940(1941).—Meteorological data for the Karelska Expt. Station are tabulated for 1939, by months, with respect to air temp., precipitation, snowfall, cloudiness, wind velocity, and wind direction. A field study showed that the air temps. at ground level on cold nights of the growing season were considerably higher over sandy soil than above either moss or bog soils. In general the year was descr. as follows: late winter, normal; spring, late and cold; summer, dry and with frequent late and early frosts; fall, dry; winter, earlier than usual and with much snow. The annual precipitation was only $\frac{2}{3}$ of normal.—W. A. F. Hagborg.

8899. SCHUBERTH, A., und R. GRUNER. Über Wettereinflüsse auf Tuberkulosekranken. *Zeitschr. Tuberk.* 83: 12-32. 1939.—Using records from many patients at Davos the weather sensitivity of tuberculous persons was studied. Certain weather processes seem to increase many symptoms, but the same weather type does not always produce the same symptoms, for the latter vary according to the patient's disposition. A front passage is more effective on symptoms the greater the time elapsed since the previous front passage and the more extreme the contrast in the air masses across the front. The effects of the fronts can be much mitigated with ambulatory patients by outdoor exposure (conditioning) before the front arrives and by medical treatments.—R. G. Stone.

8900. VESIKIVI, ANTTI. (Leteensuo Exp. Sta., Finland.) Väderleksförhållanden vid Finska Mosskulturföreningens försöksstationer år 1939: I. Leteensuo försöksstation. [Weather conditions at the expt. stations of the Finnish Bog-cultivation Society for 1939. I. Leteensuo Expt. Station.] *Finska Mosskulturfören. Årsbok* 44: 45-49. 1940 (1941).—Meteorological data for the Leteensuo Expt. Station during 1939 are given in tabular form by months with respect to air temp., precipitation, cloudiness, wind direction, and wind velocity. Mean temp. and mean precipitation by months are also given for the 35-yr. period 1904-1938. The mean temp. for the growing season of 1939 was 0.6° C warmer than the 35-yr. mean, with Aug. the warmest month of 1939. Severe frosts occurred in May. On June 29 a frost of 1.8° C damaged potato plants. The first fall frost, -4.3° C, occurred on Sept. 3. The growing season was characterized by drought conditions in May, June, and Aug., resulting in a total precipitation for the 5 months of the growing season of only 176.7 mm., 113 mm. lower than the 35-yr. norm.—W. A. F. Hagborg.

8901. VOTCHAL, A. E. (Physiological bases of the resistance of plants to hot, dry winds.) I. Artificial dry-wind apparatus and methods of work. [With Eng. summ.] *Vestn. Sotsial. Rast. (Soviet Plant Industr. Record)* 1: 63-70. Illus. 1940.—A special apparatus for creating artificial hot, dry wind at any time during the vegetative period was

used. The air introduced into the chamber is dried in a cold generator by the condensation of the water vapors on very cold (-21° C) walls consisting of linen sacks filled with ice and salt. The air, dried in this simple way, is heated to the required temp. and introduced into the chamber with the plants under experimentation. The amt. of air admitted is regulated by a special mixture which makes it possible to change the humidity of the air within the chamber according to a previously adopted curve with an accuracy as close as 0.5%. 4 electric fans within the chamber create a circular current of air the velocity of which can be varied from 0.4-6 m. per sec. The temp. of the air in the chamber is kept at a given level by means of an electric fan. A special thermoregulator makes it possible to regulate the temp. regime according to a previously elaborated curve. The velocity of the wind, the temp. and the rel. humidity of the air in the chamber are regulated independently of one another, which makes it possible to create and maintain for prolonged periods any combination of these factors. The water evaporated by the plants as a result of transpiration causes an increase in the humidity of the dry air entering the chamber to a definite given height. Taking into account the amt. of dry air, its temp., and its humidity, and introducing the element of time into these calculations, it is possible, with only a small error to obtain an integral curve of the course of transpiration of all the plants under experimentation under conditions of hot, dry wind. This curve is of interest only when the expts. are made with homogeneous material. As a result of expts. made in the summer of 1937, it was demonstrated that by the use of this dry-wind apparatus it is possible to create and maintain for prolonged periods conditions characteristic of hot, dry winds and thus conduct expts. according to a previously outlined plan.—Freeman Weiss.

8902. WEGER, N. (Agrarmeteorol. Inst., Geisenheim, a. Rh.) Die Temperaturverhältnisse in Isolierkästen. *Gartenbauwiss.* 14(5): 604-613. 1940.—Max. and min. temps. inside hotcaps and in the open were recorded hourly by means of electrical resistance thermometers. Hotcaps consisted of wire or wooden frames covered with loosely woven muslin. During the day both max. and min. temps. inside the hotcaps were nearly always higher than outside; during the night lower min. values were recorded under the hotcaps than in the open. This was especially true in cases where small hotcaps were employed. Differences in temp. inside and outside hotcaps are attributed to the effect of air movement, heat radiation and heat absorption.—Hans Platenius.

ANIMAL

8903. BALDWIN, ERNEST, and R. A. BEATTY. (Cambridge.) The pigmentation of cavernicolous animals. I. The pigments of some isopod crustacea. *Jour. Exp. Biol.* 18(2): 136-143. 1941.—In an extracted paste of *Asellus aquaticus* the pigment is purplish, non-extractable, bleached by acid H_2O_2 , and gives a red soln. in boiling alcoholic potash. In this sp. and also in *A. meridianus* and *A. aquaticus cavernicola* pigmentation occurs in branched chromatocytes as granules which reduce $AgNO_3$ and resist extraction after years of preservation. All this indicates a melanin. It appears unaffected in animals living in darkness for months, or in their offspring. A cross between a colorless ♀ *A. aquaticus cavernicola* and a pigmented ♂ *A. aquaticus* produced fertile young, suggesting genetical analysis of color types among hypogean asellids. By partition, chromatographic adsorption, and spectroscopic methods, using standard pigments, the extractable pigment in gut-cleared, algae-free animals was found to be mainly β -carotene and cryptoxanthine.—C. V. Winder.

8904. BEATTY, R. A. (Cambridge.) The pigmentation of cavernicolous animals. II. Carotenoid pigments in the cave environments. *Jour. Exp. Biol.* 18(2): 144-152. 1941.—Extractions of detritus were analyzed for carotenoid pigments by Kuhn and Brockmann's (1932) microtechnique of partition, chromatographic adsorption and spectroscopic examination. An unidentified red pigment with strong fluorescence and absorption maximum at $457 \pm 2 \text{ m}\mu$ in CS_2 was found in all samples. In the Postumia Grotte β -carotene and large quantities of at least 4 xanthophylls were found in detritus swept into a pool in connection with

the underground river. Small amts. of carotenoids were found in a winter-flood pool, very little in air-borne detritus at the cave-mouth, and none in a drip-pool not connected with the river. None appeared in air-exposed detritus from Chislehurst Cave. The cave salamander *Proteus* yielded some xanthophylls (eviscerated) and carotene (liver). The cave amphipod, *Niphargus*, from the drip pool, yielded no carotenoids.—C. V. Winder.

8905. BROEKHUYSEN, G. J. A preliminary investigation of the importance of desiccation, temperature and salinity as factors controlling the vertical distribution of certain intertidal, marine Gastropods in False Bay, South Africa. *Trans. Roy. Soc. S. Africa* 28(3): 255-292. 2 pl., 6 fig. 1940.—*Littorina knysnensis*, *Thais dubia*, *Oxystele variegata*, *O. tigrina*, *O. sinensis* and *Cominella cincta* were the gastropods used. *L. knysnensis*, and *O. variegata* were best able to withstand desiccation induced artificially in the laboratory. *O. cincta* and *O. sinensis* were least able to withstand desiccation. The natural positions on the sea shore showed a correlation with the results obtained artificially. Temp. and salinity are less important than desiccation in determining distribution.—M. R. Levyns.

8906. CARLSON, C. EDWARD. Pheasants and the past winter. *Conserv. Volunteer (St. Paul, Minnesota)* 2(9): 47-50. 1941.—Description of two unprecedented storms and of the destruction they caused among pheasants. On one census area the birds were reduced from 50 to 29 per square mile. Despite this loss, the number of pheasants going into the nesting season compares favorably with that of 1939 which proved to be a successful hunting year.—Courtesy *Wildl. Rev.*

8907. DEERE, EMIL O. (Bethany Coll.) Crowding and its effect on organisms. *Trans. Kansas Acad. Sci.* 44: 29-38. 1941.—An address, with an extensive bibliography.

8908. HICKS, ELLIS A. (Iowa State Coll.) Some major factors affecting the use of two inventory methods applicable to the western fox squirrel, *Sciurus niger rufiventer* (Geoffroy). *Iowa State Coll. Jour. Sci.* 16(2): 299-305. 1942.—Two inventory methods, linear count and spot count, were used to learn of the factors affecting activity of the fox squirrel on a 250-acre timbered area, Story County, Iowa, over 1.5 yrs. Use of the methods was greatly influenced by temp., degree of cloudiness, topography, vegetative distribution and association, precipitation, season of year, hour of daily observation. The temp. range 31-50° F. was most conducive to squirrel activity. Clear days brought on much more activity than cloudy days. Activity was at a peak in fall, about one-half as great in spring and summer as in fall, and slightly less in winter than in spring or summer. The daily peak of activity was at 8:00 A.M.-10:00 A.M., with a minor surge from 1:00 P.M.-2:00 P.M.—E. A. Hicks.

8909. HUNGATE, R. E. (U. Texas.) Experiments on the nitrogen economy of termites. *Ann. Ent. Soc. America* 34(2): 467-489. 1941.—The N relationships of the termites, *Zootermopsis*, *Reticulitermes* and *Kalotermes*, have been investigated by determining the amt. of N in the food and in the termites. Termites fed upon sound wood failed to grow. With rotten wood growth was occasionally obtained and in the successful expts. the N content of the wood increased at the expense of N in the soil. Fungi are presumably the agents active in transporting N, but not all are equally effective. Termite-infested woods show an av. N content higher than sound wood, indicating accumulation by fungi in nature. Addition of N as NH_4^+ , NO_3^- , or yeast extract increased the amt. of N assimilated. No fixation of atmospheric N was observed. In expts. with *Kalotermes* the N assimilated could be shown to come from the wood. In one *Zootermopsis* culture calculations indicated assimilation of 50% of the eaten N. Filter paper and cotton showed variation in N content, some filter papers containing as much N as some woods. Dependence upon fungi as food is apparently a primitive feature in the Isoptera.—R. E. Hungate.

8910. KENDEIGH, S. CHARLES. (U. Illinois.) Analysis of losses in the nesting of birds. *Jour. Wildlife Management* 6(1): 19-26. 1 fig. 1942.—The outcome of 2,725 nesting attempts of 51 spp. of mostly forest-edge birds and the % of all eggs to develop into fledglings are reported. Species that nest in holes or other relatively inaccessible locations

have the highest % of success. Nest failures in the house wren (*Troglodytes aedon*) are more frequent during the 1st, than during the 2d, breeding period. In all spp. the daily rate of nest failures decreases with the progress of the nesting cycle. In successful nests the % of eggs that hatch is significantly greater in most spp. than the % of young that leave the nest after hatching. The % of eggs in the house wren that are infertile or that become addled is low at medial monthly air temps. of 58°-70°F but becomes appreciably greater at both higher and lower temps.—S. C. Kendeigh.

8911. KESAVA PANIKKAR, N. (Marine Biol. Lab., Plymouth.) Osmoregulation in some palaemonid prawns. *Jour. Marine Biol. Assoc. United Kingdom* 25(2): 317-359. 1 fig. 1941.—The brackish-water prawn *Palaemonetes varians* and the marine prawns *Leander serratus* and *L. squilla* are hypotonic in normal sea water, the blood of these species showing osmotic pressures equivalent to 2.3, 2.8 and 2.6% NaCl, respectively, in an external medium of 3.5% NaCl. *P. varians* is isotonic in water of about 2% NaCl and the species is practically homoiosmotic, the difference in its osmotic pressure over a range of 5% of NaCl in the external medium being only 0.8-1%. The sp. has a wide range of tolerance from water that is nearly fresh to conc. sea water equivalent to 5.2% NaCl. *L. serratus* is much less homoiosmotic than *Palaemonetes*, and has a limited tolerance to dilution and conc. of the environment. Homoiosmoticity is maintained up to a dilution of 2.5% in the external medium when isotonicity is reached; in lower dilutions there is steady decline in osmotic pressure and the regulatory mechanism evidently breaks down. The osmotic behavior of *L. squilla* is similar to that of *L. serratus*, but the homoiosmotic behavior is more marked and it has greater tolerance to dilution of the environment. When *Leander* and *Palaemonetes* are transferred to very dilute sea water, the internal osmotic pressure falls gradually for about 14-24 hrs., varying according to the size of the individual; after the lowest value has been registered there is a slight rise, and a steady state is thereafter maintained. Studies on the changes of wt. of prawns when transferred to diluted media indicate that the integument (gills) is permeable to water and that, at least in *L. serratus*, the amt. of water entering is mainly responsible for the dilution of the blood. There is a similar fall in wt. when prawns are transferred to conc. media, due to loss of water. The urine of *Palaemonetes* and *Leander* is nearly isotonic with the blood irrespective of the nature of the external medium in which the animal is placed; this suggests that the kidneys do not play a significant part in the osmoregulation, even in examples of *Palaemonetes* acclimatized to nearly fresh water. The contents of the dorsal sac, the nephroperitoneal sac, and the urinary bladder of *L. serratus* were separately removed and the osmotic pressures detd.: they do not present significant differences; hence a salt reabsorbing or a water reabsorbing mechanism is absent in the excretory organs. There is a slight rise in the osmotic pressure of prawns (*L. serratus*) about to moult and the value falls to normal a few days after the moult. A prawn of fresh wt. 1 g. absorbs about 0.3 g. of water during moulting. The gills of palaemonid prawns are permeable to water in both directions and, to a slight extent, to salts; but as compared with stenohaline animals, the permeability of the gills of *Leander* and *Palaemonetes* is very low, and especially so in *Palaemonetes*. Both *Palaemonetes* and *Leander* drink the external medium as judged by expts. with dyes; this behavior is erratic and occurs even when in hypotonic media. The evidence is insufficient to assume that water drinking is essential for osmoregulation. The prawns can assimilate ions from dilute solns. presumably through the gills; part of the absorption of salts may also take place through the gut wall. The possible occurrence of some salt-excreting mechanism is emphasized, probably in the gills; it has not been cytologically proved to exist, but attention is drawn to the excretory cells occurring in the gills. The osmoregulatory rôle of the gill in the light of its histological structure is discussed. Palaemonid prawns seem to achieve osmotic stability by active absorption of ions when in hypotonic media and there is strong circumstantial evidence for active transport of water against the osmotic gradient, probably very effective when in hypertonic media. The

osmotic work required for adjustment is brought to a minimum by the low permeability of the integument (gills), which gives the prawns considerable powers of salt retention.—The significance of the osmotic behavior of *Palaemonetes* and *Leander* in the evolutionary history of the Palaemoninae is discussed. *L. serratus* and *L. squilla* are probably spp. that have taken secondarily to marine life.—*From auth. summ.*

8912. SCHOLANDER, P. F. (U. Oslo.) Experimental investigations on the respiratory function in diving mammals and birds. *Norske Vidensk. Akad. Oslo Hvalrådets Skrift. Sci. Results Marine Biol. Res.* 22: 1-131. 1940.—Exptl. animals were studied in an apparatus that permitted taking records of heart activity, chemical changes in arterial blood, and complete continuous registration of the gaseous exchange before, during, and after submergence in a bath. The most detailed studies were made on 2 spp. of seal, *Halichoerus grypus* and *Cystophora cristata*. The "dives" lasted up to 18 min. There is an immediate drop in heart rate during diving, from 150 to 10 beats per min., the low frequency being brought about by any interference with breathing and lasting throughout the dive. The storage capacity for O_2 in the blood and tissues is the limiting factor for prolonged diving; diving ability is achieved through a high myoglobin content combined with a reduction of metabolism to about $\frac{1}{2}$ of the resting level during diving and a reduction of blood supply to the muscles. The lactic acid content of the arterial blood rises slightly during diving, but a marked rise occurs during recovery, and the rise is proportional to the length of the dive. The O_2 debt accumulated during diving appears to be largely confined to the muscles and is paid off during recovery by a slight excess intake of O_2 ; a slight drop in body temp. also occurs during recovery. The blood RQ and the alveolar air RQ are both low during diving; the total recovery RQ is slightly higher than the resting value. Actual O_2 and CO_2 dissociation curves are given, based on simultaneous analyses of alveolar air and arterial blood during re-breathing expts.; the low sensitivity to CO_2 found by Irving is confirmed. A beaver, *Castor fiber*, proved to be a poor diver; O_2 insufficiency affected the heart after 3 min. Study of a porpoise, *Phocoena communis*, showed the resting consumption of O_2 to be exceedingly high, and the ventilation to be unusually effective, the O_2 utilization from the inspired air being 8%. A freely diving animal showed no reduction of heart rate, nor did enforced submersion induce it; this supports the suggestion that the retia mirabilia of whales may act as arterio-venous shunts, allowing the blood to by-pass the muscles during the dive. The muscles may hold half the total O_2 store of large whales, due to their high myoglobin content. Available data are believed to indicate a greatly reduced O_2 consumption during the diving of whales. Expts. carried out with domestic ducks and 2 spp. of penguin, *Eudyptes chrysolophus* and *Pygoscelis papua*, gave results similar to those on seals, except that the excess O_2 intake during recovery was greater, and the recovery period shorter; the O_2 storage capacity is surprisingly small in the penguins.—The problem of deep diving in various animals is discussed. The invasion rate of N_2 is one of the determining factors for caisson disease; a totally submerged frog is nearly immune to the disease, while a frog breathing compressed air is not, and among the submerged frogs those with more air in the lungs suffered more from gas embolism. Whales dive below the level of alveolar collapse, after which N_2 invasion must be very slow. No evidence of symbiotic N -fixing organisms was found in whale blood. Gas embolism occurred after submergence of a seal to 300 m., and probably occurs exceptionally in whales.—*E. S. Deevey.*

8913. SMITH, CARROLL N., and MOSES M. COLE. Effect of length of day on the activity and hibernation of the American dog tick, *Dermacentor variabilis* (Say) (Acarinae: Ixodidae). *Ann. Ent. Soc. America* 34(2): 426-431. 1941.—To test the influence of the photoperiod, or length of daylight, on the activity and hibernation of the American dog tick, larval, nymphal, and adult ticks were exposed to artificially extended photoperiods, and their activity, as indicated by their readiness to engorge, tested against that of comparable lots exposed to normal winter

daylight. This expt. was conducted for 2 winters, and it was found that larvae and nymphs exposed to lengthening artificial photoperiods corresponding to those of Mar. 24 to June 21 engorged much better than those exposed to the normal, decreasing photoperiod from Sept. 20 to Dec. 18, even with slightly higher temps. in favor of the latter. When the artificial photoperiod passed its peak and began to decrease, corresponding to the shortening days of July, the difference between the behavior of ticks exposed to it and of those exposed to the normal photoperiod of the lengthening days of Jan. was not so great, and by Feb., when the artificial photoperiod resembled that of Aug., those from the warmer, normal-day room were most active. The increased photoperiod had no effect on the activity of adults during either winter.—*C. N. Smith.*

PLANT

8914. ALBERTSON, F. W. (Ft. Hays Kansas State Coll.) Prairie studies in west central Kansas: 1940. *Trans. Kansas Acad. Sci.* 44: 48-57. 10 fig. 1941.—An account of the tragic changes in the composition and % of basal cover of native prairie vegetation after 7 yrs. of continuous drouth (1933-1939).—*F. C. Gates.*

8915. ALLARD, H. A. (U. S. Dept. Agric., Washington, D. C.) *Tragopogon dubius*; its response to length of day. *Ecology* 23(1): 53-58. 2 fig. 1942.—The length-of-day responses of the introduced yellow-flowered *T. dubius*, now established in the Shenandoah Valley of Virginia, were studied. During the 1st year the plants remained in rosette form, but all flowered the 2d yr., with varying degrees of stem elongation. In response to shortened days, the flower stems were reduced in length, and, in the case of 10 hrs., the flower was practically sessile among the leaves when any flowering occurred. Obviously, this is a long-day plant, with root enlargement and longevity favored by short days, and flowering, stem elongation, and early death or biennial behavior favored by progressively increasing lengths of day.—*H. A. Allard.*

8916. BEATH, O. A., C. S. GILBERT, and H. F. EPPSON. (Wyoming Agric. Exp. Sta., Laramie.) The use of indicator plants in locating seleniferous areas in western United States. IV. Progress report. *Amer. Jour. Bot.* 28(10): 887-900. 10 fig. 1941.—Continuing previous studies, the Se content of 407 native and cultivated plants was detd. In addition to formations of Upper Cretaceous age, seleniferous plants have been found on formations of Triassic (Chinle), Jurassic (Wingate, Kayenta, marine Sundance), and Lower Pennsylvanian (Paradox) ages, in New Mexico, Arizona, Utah, and Wyoming. Some quaternary alluvial deposits of Wyoming and New Mexico contained Se. 4 spp. are added to the list of Se indicator *Astragalus*, viz.: *Astragalus albulus* (not *A. humistratus* Gray); *A. ellisiae* Porter (*Jonesia e. Rydb.*); *A. rafaelensis*; and *A. sopheroides*? A wide variation in Se content was found in spp. of *Stanleya*, *Aster*, *Atriplex*, and *Castilleja*. Samples of *S. pinnata* from the same location varied from 47 to 1456 ppm. of Se. The amt. in *C. chromosa* is independent of that in the host plant with which it is associated. A series of analyses of wheat plants from Montana showed that they absorbed relatively small amts. of Se, although *Astragalus pectinatus* and *A. bisulcatus* growing in the immediate vicinity were highly seleniferous.—*O. A. Beath.*

8917. BHARUCHA, F. R., and D. B. FERREIRA. The biological spectra of the Matheran and Mahabaleshwar flora. *Jour. Indian Bot. Soc.* 20(4): 195-211. 6 fig. 1941.—The biological spectra of these 2 regions viewed in relation to their respective hydrotherm figures show the existence of a phanerophytic plant climate characteristic of tropical regions.—*P. D. Strausbaugh.*

8918. BRANSON, LESTER R. (Fort Hays, Kansas State Coll.) An analysis of seed production of native Kansas grasses during the drouth of 1939. *Trans. Kansas Acad. Sci.* 44: 116-127. 4 fig. 1941.—The study indicated that the production of caryopses by native grasses correlated with the available soil moisture during the period of flowering and seed maturing and that other climatic factors were indicators of caryopses production to whatever extent they affected soil moisture.—*Auth. summ.*

8919. BROWN, CLAIR A. (Louisiana State U.) Studies

on the isolated prairies of Louisiana. *Amer. Jour. Bot.* 28 (10): 16s. 1941.—An abstract.

8920. BROWN, E. O., and R. H. PORTER. (*Agric. Exp. Sta., Ames, Ia.*) The viability and germination of seeds of *Convolvulus arvensis* L. and other perennial weeds. *Iowa Agric. Exp. Sta. Res. Bull.* 294: 475-504. 4 fig. 1942.—Seeds of field bindweed (*C. arvensis*) were collected from the middle west and western parts of the U. S. and from Belgian and French Herbaria. Seeds freshly harvested produced from 7 to 24% normal seedlings and possessed 28 to 91% impermeability. Seeds 50 yrs. old from Belgium possessed 54 and 62% impermeability and germinability respectively. Germinability and impermeability in seeds freshly harvested were evident when the moisture content had reached 81 and 13% respectively. Impermeable seeds planted in the field in the fall at a 3-inch depth averaged 29% germination the following spring. Maximum root penetration by seedlings of field bindweed grown from seed in the current season (1936) was 68 inches. Optimum temp. requirements for germination of seeds of *Convolvulus arvensis*, *Euphorbia esula*, *Lepidium draba*, *Centaura repens* and *Solanum carolinense* were 20-30 and 20-35°C for all except that 30°C for *Convolvulus arvensis* and 20°C for *L. draba* were equally favorable. Minimum temp. for germination for all 5 spp. was 0.5°C except for *S. carolinense* which was 20°C. Seeds of *L. draba*, *L. repens*, *Hymenophyllum pubescens*, *Centaura calcitrata* and *S. elaeagnifolium* declined rapidly in viability after burial for 3 yrs. at 6 and 18 inches beneath the soil surface. Seeds of *C. arvensis*, *Euphorbia esula*, *Centaura repens* retained a high degree of viability after burial for 3 yrs. at 6 or 18 inches in the soil. Seeds of *S. carolinense* after 3 yrs. of burial at 6 inches lost but little in viability. From the standpoint of seed longevity in field soil the seeds of these several perennial weeds are not equally capable of maintaining the respective species.—R. H. Porter.

8921. BUELL, MURRAY F., and R. L. CAIN. A bog community in southeastern North Carolina. *Jour. Elisha Mitchell Sci. Soc.* 57(2): 202. 1941.—An abstract.

8922. D'ALMEIDA, J. F. R. (*St. Xavier's Coll., Bombay*) A contribution to the study of the biology and physiological anatomy of Indian marsh and aquatic plants. *Jour. Bombay Nat. Hist. Soc.* 42(2): 298-304. 2 pl. 1941.—At different seasons in India the land is either extremely dry or marshy. Many spp. are adapted to meet both situations. An example is *Malachra capitata*, naturalized from tropical America. It is abundant and a source of fibre similar to jute. Two potted plants were studied. One was immersed in a tub of water. The submerged stem developed numerous white lenticels, especially near the surface of the water. The stem was swollen up to a little above water level; roots appeared from the lenticels, and within 2 months these formed a heavy mat. The internal structure of the stem became altered, the superficial layers being overgrown, with large air spaces. The control plant was unchanged.—W. F. Hollander.

8923. d'ANGREMOND, A., en W. F. van HELL. Mycorrhiza van *Hevea brasiliensis* Müll. Arg. 16p. 6 fig. Vereeniging van Proefstation-Personeel: Medan, 1939.—A synopsis is given of the outstanding literature on mycorrhiza, then a description of a mycorrhizal fungus occurring in the roots of *H. brasiliensis*. The fungus occurs principally in the finer rootlets which are shorter and thicker than ordinary roots and are yellowish brown. The fungus is typically endotrophic and occurs almost exclusively in the cortical tissues. Penetration may occur in the youngest tips, in the rootcaps (calyptra), in the root hairs, and even through the old epidermal cells. The hyphae are to be found intracellular as well as intercellular and show the typical properties of a mycorrhizal fungus (intracellular hyphae are not septate, are swollen, multi-nuclear with vesiculae and arbusculae; the intercellular hyphae are septated, long and thin, forming vesicles). Mycelial clumps occur in the cells during digestion. The identity of this fungus is not yet established, but it resembles *Rhizoctonia bataticola* (*Macrophomina phaseoli*), a fungus which is widespread in tropical countries, and considered by many authorities was to be a mycorrhiza fungus.—From auth. summ.

8924. DAUBENMIRE, R. F., and W. E. COLWELL. Some edaphic changes due to overgrazing in the *Agropyron-Poa* prairie of southeastern Washington. *Ecology* 23(1): 32-40.

1942.—Overgrazing results in the replacement of the tall, dominant bunches of the perennial *Agropyron* by a community dominated by dwarf annuals. This involves a reduction in the mass of aerial shoots which would otherwise intercept precipitation as well as draw considerable water from the soil. Also, beneath the soil surface the extensive root systems of *Agropyron* are replaced by a tangle of shallow root systems of the annual plants. Intensive study of a virgin area and a nearby overgrazed area showed that the vegetation changes due to grazing are accompanied by the following changes in soil: an increase in the amt. of water which accumulates in the soil during winter; a decrease in aeration of the soil; a reduction in the ability of the soil surface to absorb water; a reduction in the degree of aggregation of soil particles; an increase in the amt. of organic matter in the upper decimeter of the soil; an increase in the population of bacteria, actinomycetes, and molds in the upper decimeter horizon; an increase in the nitrification power of the microflora, and a decrease in available P.—R. F. Daubenmire.

8925. DRATHEN, THEO. Epifitas de las espinas del quisco. *Rev. Chileña Hist. Nat. Pura y Aplicada* 43: 48-49. 1 fig. 1939.—*Tillandsia*, *Trenteopholia*, and unnamed spp. of lichens are reported growing on the spines of the quisco.—L. S. Dillon.

8926. EGLER, FRANK E. (*New York State Coll. For., Syracuse*) Indigene versus alien in the development of arid Hawaiian vegetation. *Ecology* 23(1): 14-23. 4 fig. 1942.—The arid lowlands of Oahu are now clothed with a vegetation composed predominantly of alien spp. Field studies in 1936-37 aimed to interpret the nature of the previous plant cover, present successional tendencies, and future cover types. Contrary to current opinion in the island, the alien spp. do not form an ecologic group capable of any successful mass competition with the indigenes. Alien spp. are largely light-demanding pioneers, now occupying open sites and forming early stages of succession. In the absence of anthropic disturbances, those indigenes which are tolerant will probably predominate, the aliens, with possibly a few exceptions, surviving only as subordinate members of the resulting ecosystem.—F. E. Egler.

8927. EVANARI, MICHAEL. (*Hebrew U., Tel Aviv*) On some types of succulent plants. *Chron. Bot.* 6(14): 314-315. 1941.—The succulents may be classified according to their anatomical structure into true succulents and xeromorphic succulents and according to their habitat into halo-succulents and xero-succulents.—L. J. Gier.

8928. FRAZIER, J. C. (*Kansas Agric. Exp. Sta.*) The root system of perennial pepper grass (hoary cress) *Lepidium draba* L. *Amer. Jour. Bot.* 28(10): 2s-3s. 1941.—An abstract.

8929. HASE, CECIL L. (*Fort Hays Kansas State Coll.*) The effect of clipping and weed competition upon the spread of pasture grass seedlings. *Trans. Kansas Acad. Sci.* 44: 104-115. 10 fig. 1941.—The root systems of all grasses used were reduced somewhat by clipping, but were greatly reduced by clipping plus weed competition. In both conditions the basal cover is reduced in these expts. on the high plains near Hays, Kansas.—F. C. Gates.

8930. HENDRICKS, B. A. (*S. W. Forest and Range Exp. Sta., Tucson, Ariz.*) Effect of forest litter on soil temperature. *Chron. Bot.* 6(19/20): 440-441. 1941.—Litter formed an insulating layer for soil (daily temp. range of 18° for bare soils and 6° for litter-covered soils) resulting in less freezing and consequently more opportunity for infiltration of rain and snow water.—L. J. Gier.

8931. HILTON, JAMES W. (*U. Utah*) Effects of certain micro-ecological factors on the germinability and early development of *Eurotia lanata*. *Northwest Sci.* 15(4): 86-92. 1941.—*E. lanata* is a valuable forage plant which is rapidly disappearing from the desert ranges of western N. America. This study was undertaken to determine the influence of various factors on the germination of the seeds and the survival of the seedlings. Seeds stored for more than a year showed considerable loss of vitality; those more than 3 yrs. old showed very little germination. Of seeds removed from the parent plants in mid-Oct. and planted 9 days later only 12% germinated; of those stored for 2 months before planting 67% germinated; seeds kept moist and at freezing temps. for 1-3 months gave 90% germination, but the

seedlings were usually unhealthy and deformed. Seeds removed from the plants in late Nov. gave 99% germination when planted the following Feb., and produced vigorous, highly colored seedlings. Seeds germinated readily at temps. from 33° to 70°. At higher temps. germination was slower, and the seedlings soon died. Seeds which germinated at 33° showed very little growth unless removed to higher temps. Fresh seeds planted outside in winter germinated readily and produced normal plants, although the average temp. was 32° and the minimum 11°. Mortality among seedlings from seeds planted in mid-summer was very high, but the surviving plants grew normally if sufficient water was supplied. Seeds germinated more readily in 0.5% NaCl soln. than in distilled water. Germination was not markedly affected by concs. up to 1.5%, but above this the decline was sharp. Viable seeds of *Eurotia* were not found in sheep droppings.—*Hans Wilkens*.

8932. HOPKINS, HAROLD. (*Fort Hays Kansas State Coll.*) Variations in the growth of side-oats grama grass at Hays, Kansas, from seed produced in various parts of the Great Plains region. *Trans. Kansas Acad. Sci.* 44: 86-95. 7 fig. 1941.—A study of plants of side-oats grama grass (*Bouteloua curtipendula*) grown at Hays, Kansas, from seed obtained in various parts of the Great Plains. Plants of southern origin grew higher, produced more foliage, but were not ready for frost and were more damaged by winter than those of northern origin.—*F. C. Gates*.

8933. IVES, RONALD L. (*Boulder, Colo.*) Atypical subalpine environments. *Ecology* 23(1): 89-96. 3 fig. 1942.—Two atypical subdivisions of the subalpine life zone in northern Colorado are: (1) those subalpine wet meadows with much peat formation which originate through local sluggishness of valley drainage rather than as a stage in lake filling; (2) alpine rain forests occurring far above normal timberline in protected glacial cirques where there is much cloudiness and high precipitation. These forests have the usual subalpine vegetation, but it is much denser and more luxuriant than the normal subalpine forest.—*Francis Ramaley*.

8934. JACCARD, PAUL. (*Fed. Polytech. Sch., Zurich.*) Sur le coefficient generique. *Chron. Bot.* 6(16): 361-364. 1941.—In comparing the genetic coefficient (ratio of the number of genera corresponding to 100 spp. in a given community) for various territories, the author finds a distinct correlation with the ecological variations shown.—*L. J. Gier*.

8935. KRAMER, PAUL J. The cause of low water loss from cacti and other plant materials. *Jour. Elisha Mitchell Sci. Soc.* 57(2): 203. 1941.—An abstract.

8936. LEE, WM. D. Native plant succession on piedmont soils. *N. Carolina Wildl. Conserv.* 5(3): 3-5, 14-15. 1941.—A general description of plant successions with notes on accompanying changes in animal life.—Courtesy *Wildl. Rev.*

8937. McCULLOUGH, HERBERT. (*Bessie Tift Coll., Forsyth, Ga.*) Studies in soil relations of species of violets. *Amer. Jour. Bot.* 28(10): 934-941. 1 fig. 1941.—Studies were made on the pH and other soil relations of the following spp. of *Viola*: *cucullata*, *papilionacea*, *triloba*, *sororia*, *blanda*, *rotundifolia*, *scabriuscula*, *striata*, *conspersa*, *rostrata*, *imbriatula*, *hastata*, *pubescens*, and *canadensis*. The majority of the species show preferences of from pH 4 to 7 with extremes for some spp., such as *V. rotundifolia*, going as low as pH 3.7 and others, such as *V. papilionacea* and *V. scabriuscula*, reaching pH 8.1 and 8.2. All results obtained show preferences for a more acid soil than those given in previous work by other authors. The quality of growth was recorded for each specimen sampled and from these records it is evident that the quality of growth of these plants is not correlated with the soil acidity alone. Other studies of the soil moisture and soil texture indicate that these factors are also important in influencing the quality of growth and the distribution of each species.—*Herbert McCullough*.

8938. MARTHALER, HANS. (*Inst. Bot. Staatsanst. München.*) Die Stickstoffernährung der Hochmoorplanzen. Zugleich ein Beitrag zum Xerophytenproblem. *Jahrb. wiss. Bot.* 88(5): 723-758. 20 fig. 1939.—Eight typical high-moor plants, *Andromeda polifolia*, *Erica tetralix*, *Calluna vulgaris*, *Vaccinium oxycoccus*, *V. vitis idaea*, *V. myrtillus*, *Carex limosa* and *Eriophorum vaginatum* were tested in water cultures for their preference to ammonium and nitrate salts

as sources of N. They all utilized the NH₄-N much more readily than the NO₃-N, especially at the higher concs. where the latter was often harmful. Growth of the plants in a nutrient soln. with 0.277 g. (NH₄)₂SO₄ per l. was many times better than corresponding plants in high-moor soil. Anatomical investigations with *Calluna vulgaris* and *V. oxycoccus* showed that a deficient N supply did not produce any significant increase in the xeromorphic structure of the plant, such as thickening of the epidermal wall and cuticle or expansion of the spongy parenchyma. Cell size, top-root ratio and number of stomata per unit surface did bear some relation to the N content. Xeromorphy is evidently a result of a number of factors and not specifically the result of N starvation.—*C. K. Horner*.

8939. MATZKE, EDWIN B. Gametophytes of *Equisetum arvense* L. *Torreya* 41(6): 181-187. 1941.—Hundreds of gametophytes of *E. arvense* were found pioneering an area left bare in an open iron mine pit which had been pumped free of water.—*M. A. Rice*.

8940. METZGER, W. H., and KLING L. ANDERSON. (*Kansas Agric. Exp. Sta., Manhattan.*) Plant succession on land in continuous alfalfa culture as influenced by fertilizer treatments. *Trans. Kansas Acad. Sci.* 44: 184-189. 1941.—Plots receiving no fertilizer treatment generally tended to maintain the alfalfa stand longer than plots fertilized with P-carrying fertilizers. Grasses invaded plots thus fertilized extensively before they appeared in unfertilized plots in significant amts. Weeds were usually most abundant in the manured plots and grasses also came into these plots abundantly. Some soils of eastern Kansas require P before alfalfa can be grown successfully. Other soils will grow alfalfa without added P but yields are increased by its application. On these latter soils it seems probable that while yields are sacrificed by failure to phosphatize the soil, pure stands of alfalfa may be maintained longer if P is not applied.—*Auth. sum*.

8941. MEUSEL, HERMANN. (*U. Halle (Saale.)*) Die Grasheiden Mitteleuropas. Versuch einer vergleichend-pflanzengeographischen Gliederung. *Bot. Arch. [Leipzig]* 41 (3): 357-418; (4) 419-519. 48 fig. 1940.—The distr. of the chief types of middle European grass heaths is given. Several individual colonies are taken as examples and descr.—*C. K. Horner*.

8942. MURRILL, WILLIAM A. (*Florida Agric. Exp. Sta., Gainesville.*) Ecologic notes on Florida hawthorns. *Ecology* 23(1): 121-123. Map, 2 fig. 1942.—The 70-odd spp. of Florida hawthorns (*Crataegus* spp.), arranged in 7 natural groups are discussed with reference to taxonomic characters and habitats. The unusual variety of habitats found in Florida, together with a favorable climate for rapid development, must greatly have influenced evolution in this highly variable group.—*W. A. Murrill*.

8943. NIELSEN, ETLAR L. (*U. Arkansas*), and JOHN B. MOYLE (*Minnesota Dept. Conserv., St. Paul.*) Forest invasion and succession on the basins of two catastrophically drained lakes in northern Minnesota. *Amer. Midland Nat.* 25(3): 564-579. Map, 16 fig. 1941.—As a result of the catastrophic partial drainage of 2 northern Minnesota lakes, Bass Lake in St. Louis County, and Sunken Lake in Itasca County, areas of soil have been exposed upon which it is possible to study directly the invasion and succession of the Northern coniferous forest species. There is little evidence of a general and orderly process of plant invasion and succession on nearly raw and slightly modified glacial soils. Most of the woody deciduous species and many of the herbaceous species are able to invade these soils directly. The success of any individual spp. seems to depend upon the texture of the soil and the amount of available water. The coniferous spp. follow the deciduous and herbaceous spp. closely on all the glacial soils. In several instances coniferous trees were noted that must have established themselves on these glacial soils almost immediately after their exposure. The apparent dominance of the non-coniferous spp. may be due to the ability of these spp. to invade an area rapidly principally because of the structure of their disseminules and not because slightly modified soils are more suited to these spp. than they are to conifers. On loose peat of a drained sphagnum-heath bog *Pinus banksiana*, *P. resinosa*, *P. strobus*, *Picea canadensis* and *Larix laricina* have successfully established themselves whereas spp.

of *Alnus*, *Populus*, *Salix* and the herbaceous flora have not; drained sedimentary peat has been taken over largely by aspen; wet sedimentary peat by willows and alder. Old talus slopes, dry cobble beaches, and well-drained areas of coarse gravel have been invalid by *Betula papyrifera* to the exclusion of almost all other woody species. *Populus balsamifera* is the most successful invader on the well drained inorganic sediments of the old lake bottoms. In places *Pinus banksiana* and *Populus tremuloides* are also abundant. Wet inorganic sediments are usually colonized by *Salix* spp.—*Authors.*

8944. PUGSLEY, H. W. Arable weeds in East Herts. *Jour. Bot.* 79(943): 105-109. 1941.—A study of about 2 acres of recently ploughed land that had remained fallow for about 10 yrs. with a list of spp.—*H. D. Merrill.*

8945. REPP, GERTRUD. (U. Wien.) Ökologische Untersuchungen im Halophytengebiet am Neusiedlersee. *Jahrb. wiss. Bot.* 88(4): 554-632. 21 fig. 1939.—The land of the Neusiedler Sea region may be conveniently divided into 4 habitats according to the prevailing soil conditions and vegetation which vary widely. (1) The banks of the sea possess a saltless fine sandy soil whose thick vegetation consists of hot and dry weather "Glykophytes." (2) Salt-profile A, a salt desert, is a compact clay soil with high salt and soda content and of poor physical structure. Its absorptive strength shows great variations but is especially high in the upper saline layers (up to 83 atm.). The sparse vegetation consists chiefly of *Lepidium crassifolium* and *Camphorosma ovata*. (3) Saltprofile B on the shores of the Stinker sea is a moist compact clay soil, low in salt and with a rather constant low absorptive strength (26 atm.). The vegetation is chiefly hydro-halophytes such as *Atropis peisonis*, *Aster pannonicus* and *Plantago maritima*. (4) Salt-profile C on the shores of Neusiedler Sea is a typical salt-marsh habitat whose absorptive strength is high and very changeable (up to 56 atm.). Its fine sandy properties and low soda content give it a favorable structure. The vegetation consists chiefly of *Salicornia herbacea* and various more or less stunted mesohalophytes. The development and osmotic values of the typical plants as related to the different soil salt content were investigated. With the higher salt content, all spp. showed similar changes, such as, higher limits of plasmolysis, increase in succulence and water content, decreased surface development, tendency for reduced leaf surface, variable stunting of the entire plant and intensified root development. Anatomically, the leaves showed enlarged parenchyma cells, reduced intercellular spaces, smaller epidermal and stomata cells and increase in number of stomata per sq. mm. These differences depend not only on the horizontal variations of soil salt content from habitat to habitat but also on vertical changes in a given habitat at different depths which the roots penetrated. The limit of salt concn. of the cell-sap of the plants as a result of absorption from the saline soils varied with the spp. Weather-induced changes in the soil produced a greater difference in the osmotic value of the cell-sap of an extreme halophyte like *Camphorosma* than in that of other plants. *Camphorosma* also possessed greater permeability toward a pure NaCl soln.—*C. K. Horner.*

8946. RIEGEL, ANDREW. (Fort Hays Kansas State Coll.) Life history and habits of blue grama. *Trans. Kansas Acad. Sci.* 44: 76-85. 8 fig. 1941.—A detailed account of the characteristics and development of blue grama (*Bouteloua gracilis*), one of the most important constituents of the high plains, from seed at Hays, Kansas. The blue grama grass grows to a height of 8 to 24 inches and produces a dense, fibrous root system which extends 6 or more feet in depth. It is highly recommended for use in artificial re-vegetation of abandoned farm lands and depleted ranges.—*From auth. summ. by F. C. Gates.*

8947. THOMAS, J. B. (Treub Lab., Buitenzorg.) A method for the quantitative determination of the amount of fibrous roots in a root system. *Ann. Bot. Gard. Buitenzorg* 51(1): 115-123. 1941.—The root surface was estimated from the quantity of water which was retained by the root system after immersion in water and subsequent draining for a definite time.—*T. H. van den Honert.*

8948. WEBB, JOHN J. Jr. (Fort Hays Kansas State Coll.) The life history of buffalo grass. *Trans. Kansas Acad. Sci.* 44: 58-75. 17 fig. 1941.—A detailed account of the development of buffalo grass (*Buchloe dactyloides*), one of the most

important constituents of the high plains, from seed at Hays, Kansas. Each bur averaged 3, caryopses; secondary roots penetrated to a depth of 4.67 ft.; stolon roots grew at the rate of 2.5 cm. per day during the first 3 weeks after growth began; stolons grew from 0.5 cm. to 5 cm. per day and were responsible for the rapid manner in which buffalo grass covered the ground; one plant produced 650 feet of stolons at the age of 84 days.—*From auth. summ. by F. C. Gates.*

8949. WHITMAN, WARREN C. Seasonal changes in bound water content of some prairie grasses. *Bot. Gaz.* 103(1): 38-63. 1941.—A study of the bound and free water content of several components of I. Upland prairie (*Bouteloua gracilis*, *Stipa comata*, *Carex filifolia* and *Andropogon smithii*); II. Sagebrush type (*Ariemisia cana*, and *Stipa viridula*); III. Sandgrass type (*Calamovila longifolia*, *Carex filifolia*, *C. eleocharis*, *C. pennsylvanica*, and *Koeleria cristata*); and IV. Big bluestem type (*Andropogon furcatus*, *Stipa spartea*, and *Bouteloua curtipendula*) in western N. Dakota using the calorimetric method indicated that the bound water %, % free water, and grams of free water per 100 g. of dry matter gave the best expression of the responses of the species to the conditions of their habitats. The % bound water in a species was apparently a reflection of the relative degree of dryness of the habitat and not a measure of the inherent adaptation of that species to a dry habitat because the absolute amt. of bound water, expressed as g. per 100 g. of dry matter, remained at approx. the same characteristic level in the species during the season. The increases in bound water as % of the total water resulted from losses in free water caused by progressive drying of the plant tissues and not from increases in the water-retaining capacity of the leaves.—*W. C. Whitman.*

8950. WHYTE, R. O. (Imp. Bur. Pastures and Forage Crops, Aberystwyth, G. B.) The grasslands of Latin America. *Chron. Bot.* 6(19/20): 443-446. A "brief and generalized account" with a bibliography of 26 papers.—*L. J. Gier.*

8951. WRIGHT, KENNETH E. The Great Swamp. *Torreya* 41(5): 145-150. 1941.—The Great Swamp is 10 miles in area near South Kingston, R. I. and affords ecological contrasts of plant life in ponds, swamps, and forested land to an elevation of 155 ft.—*M. A. Rice.*

8952. ZOBELL, CLAUDE E., and CATHARINE B. FELTHAM. (U. California, La Jolla.) The bacterial flora of a marine mud flat as an ecological factor. *Ecology* 23(1): 69-78. Map, 1942.—The relationship of the bacterial population to chemical, physico-chemical, and biological conditions in Mission Bay, a shallow body of sea water near San Diego, California, has been under observation for several years. The water contains from several thousand to a few million bacteria per cc. and the bottom which is often exposed at low tide contains many millions of bacteria per gram representing a variety of physiological types. Living bacteria occur in the mud at depths far below that at which other organisms are found. By depleting the dissolved O₂ content, by reducing the O/R potential, by decreasing the pH, and by producing H₂S and possibly other toxic products, bacteria create environmental conditions at certain places in the mud which are inimical to other forms of life. More generally bacteria are beneficial by serving as food for mud-dwelling animals and by mineralizing organic matters with the production of plant nutrients. In view of the different ways in which bacteria influence environmental conditions and the nutrition of mud flat flora and fauna, they should be considered as an important ecological factor.—*C. E. Zobell.*

OCEANOGRAPHY

(See also Entry 10370)

8953. MILLER, ROBERT C. Plankton investigations at the University of Washington. *Proc. 6th Pacific Sci. Congr.* 3: 585-586. 1939.

8954. MOORE, HILARY B. (Biol. Sta., Bermuda.) A wire-angle indicator for use when towing plankton nets. *Jour. Marine Biol. Assoc. United Kingdom* 25(2): 419-422. 4 fig. 1941.—An angle indicator is described and plans for its construction are given. The instrument remains in place throughout the tow and gives a large dial reading which can be seen from a distance; thus the depth of the tow nets can be regulated very closely. The instrument is oil damped, so

that the pitching of the ship and the vibration of the wire hauling do not affect it.—*Chancy Juday*.

8955. RILEY, GORDON A. (*Bingham Oceanogr. Lab.*) Plankton studies. IV. Georges Bank. *Bull. Bingham Oceanogr. Coll., Peabody Mus. Nat. Hist. Yale Univ.* 7(4): 1-73. 1941.—Six cruises were made to Georges Bank, an oceanic shoal south of the Gulf of Maine, between Sept. 1939 and July 1940. Analyses made at representative depths included plant pigments, NO_3 , PO_4 , and O_2 . Production of O_2 by the surface plankton was determined by suspending dark and light bottles of surface water in a tub on deck. A study of methods showed the estimation of plant pigments to be superior to that of chlorophyll, cell number, calculated cell volume, dry wt., organic matter, and ash as an index of phytoplankton. In summer phytoplankton was concentrated over the bank, decreasing toward deeper water on all sides, but the total quantity under unit area was not markedly greater over the bank. Minimum quantities were found in January. The spring diatom burst began in March and lasted until May, starting in shallow water and lasting longer there, but at the height of the bloom the conc. was fairly uniform both on and off the bank. Variations in % saturation of O_2 and in O_2 production were similar. Nutrients were most abundant in shallow water in summer. During the bloom an inverse relation appeared between phytoplankton and nutrients, and large quantities were also present in Jan. An anomalous increase of NO_3 in May is attributed to an influx of off-bank water. Plant pigments, % saturation of O_2 , and O_2 production showed positive correlations with light and negative ones with temp.; the positive correlation between pigments and nutrients during the summer is attributed to the high rate of regeneration and vertical transport in shallow water; this is also indicated by the low N:P ratio. During most of the year, however, the relation was negative. In a detailed discussion of the seasonal cycle it is pointed out that during autumn, winter, and early spring the chief limiting factors are probably light and turbulence, and that depth is important when it limits turbulence; hence the beginning of the bloom in the central part of the bank. During the summer the plankton growth is limited by nutrients, grazing, and high temp.; the last, as shown, increases the resp. of phytoplankton, and affects flotation. The mean standing crop varied during the period of observation from 2 to 39 g. of C per sq. m. of sea surface, and the mean total productivity probably varied from 0 to 1 g. per sq. m. Estimates of productivity are based on % saturation of O_2 and on exptl. utilization of NO_3 as well as on exptl. O_2 production. The total productivity over the bank is probably little greater than in surrounding waters, but the larger conc. of phytoplankton on the bank is believed to increase the grazing efficiency of both zooplankton and bottom fauna.—*E. S. Deevey*.

8956. THOMPSON, THOMAS G. Activities of the oceanographic laboratories of the University of Washington, Seattle, Washington. *Proc. 6th Pacific Sci. Congr.* 3: 127-137. 1939.—An intensive program representing both the biol. and physical sciences, as applied to the various phases in oceanography, continues in operation. Two series of publications provide outlets for papers. One is the reprint series in oceanography, which consists of reprints of papers appearing in various scientific journals; the other is publications in oceanography, which come from the Univ. of Washington Press.—*F. A. Davidson*.

LIMNOLOGY

(See also Entries 8954, 10175, 10370)

8957. MINDER, LEO. (*Zürich*) Über die Löslichkeit des Sauerstoffs in Gebirgsgewässern. Rechenhilfen für limnologische Untersuchungen. *Vierteljahrsschr. Naturforsch. Ges. Zürich*. 86: 157-183. 1941.—Local barometric pressure, necessary for the determination of % saturation of O_2 , can be computed accurately by the formula

$$\log B = \log B_0 - (h_2 - h_1) / [18421(1 + \alpha[t_1 + t_2]/2)]$$

where B =local pressure, B_0 =mean pressure (preferably monthly) at a lower station, h_2 and h_1 are the respective elevations, $\alpha=1/273$, and t_1 and t_2 are the respective mean temps. For practical purposes, however, e.g., below 2500 m. in Switzerland, linear fall in pressure between 2 adjacent stations can be assumed:

$$B = B_0 - [(B_0 - B_2) / (h_2 - h_1)](h_2 - h_1)$$

where B_0 , B and B_1 , and h_1 , h_2 , and h_3 , are the pressure and elevation at a lower station, the local station, and a higher station, respectively. Saturation of O_2 at the observed temp. is then multiplied by $B/760$ to correct for local pressure. Differences between the solubility values of Winkler and those of Fox are due to the fact that Winkler's table refers to the solubility of O_2 in moist air, Fox's in dry air. If Winkler's table is used, the correction for water vapor is

$$l = [(B - f) / (760 - f)]l_0$$

where l_0 is the solubility given by the table, l the true solubility, and f the vapor pressure. If Fox's table is preferred, the formula is $l = [(B - f) / 760]l_0$. A table of values of f at diff. temps. is given, and a revised version of Fox's table, based on the best value of the partial pressure of O_2 , 20.96%, is also given, interpolated at 10th's of a degree C. after Birge and Juday.—*E. S. Deevey*.

8958. RIOJA, ENRIQUE. (*U. Nac. Autónoma, México, D. F.*) Consideraciones acerca de los tipos morfológicos marinos bentónicos y planctónicos. [Morphological types or marine benthos and plankton.] *Ciencia* 2(2): 64-66. 1941.—The classifications of Gislen and Rioja are compared and discussed.—*W. C. Tobie*.

WILDLIFE MANAGEMENT—AQUATIC

(See also Entries 9878, 10175, 10228, 11134, 11165, 11169, 11476)

8959. BRUNO VIDELA, PEDRO H. Determinación de la perdida de peso en los salmonidos en el acto del desove. [Loss of weight following ovulation in salmon.] *Rev. Med. Vet. [Buenos Aires]* 23(5/6): 239-246. 3 fig. 1941.—Fish caught carefully in a cotton hand-net were weighed before and after ovulation. Salmon of the *sebago* var. lost an average of 970.58 g. following ovulation, trout *Salvelinus fontinalis* lost 256.5 g.; these wts. include the weight of ova and fluid. During ovulation, relaxation of the sphincter allows the entrance of water which causes hydration of the ova thus assisting in fertilization. A 1-kg. live-wt. of salmon produced 1,035 ova having a diam. of 5.481 mm.; a trout produced 2,815 ova having a diam. of 4.122 mm. per kilo live wt.—*J. P. Scott*.

8960. CHAPMAN, WILBERT McLEOD. Observations on the migration of salmonoid fishes in the upper Columbia River. *Copeia* 1941(4): 240-242. 1941.—Steelhead trout transferred from the Columbia River to the Wenatchee River by truck and retained in that stream for a month were found to have backed down the Wenatchee and proceeded on up the Columbia on their spawning migrations. For the Columbia River Sockeye salmon the theory that, given similar other conditions, the adult migrants will turn into the tributary having the lower temp., does not apply. Data are cited which demonstrate that Columbia River salmonoids move freely through fish ladders in the daytime regardless of the intensity of the sunlight.—*W. McL. Chapman*.

8961. CLARK, G. H. Economic appraisal of introduced fishes in the waters of California. *California Fish and Game* 28(1): 16-21. 2 fig. 1942.—Methods are shown to calculate the economic appraisal of the introduced species of fishes into California waters. An economic appraisal of the introduced spp. is shown in 2 ways: (1) the potential value over a long period of time, resulting in a value of \$651,000,000; (2) an annual value of these introduced species in excess of \$13,000,000.—*G. H. Clark*.

8962. DOMANTAY, JOSE S. (*Dept. Agric. and Comm., Manila*) The fishing industry of Margosatubig. *Philippine Jour. Sci.* 72(4): 371-382. 6 pl. 2 fig. 1940.—A description of the methods used in taking and preservation of fish. Illegal fishing with explosives and poisonous substances is reducing the income of the fishermen.—*C. H. Meredith*.

8963. GROSS, F. (*U. Edinburgh*) Food production by fish and oyster farming. *Nature [London]* 148(3742): 71-74. 1941.—Transportation of large numbers of small flat fishes taken by fishermen and many cultured from eggs to waters that have been treated with nitrate, phosphate and other manures to promote growth of phytoplankton is advocated as a means of producing fish of marketable size in 2 years. Methods of culturing and transplanting oysters are evaluated.—*E. D. Crabb*.

8964. HEY, D. (*Jonkershoek Trout Hatchery, S. Africa*) The establishment and maintenance of freshwater fish in South Africa. *Jour. S. African Forest. Assoc.* 6. 4-25. 5 fig.

1941.—The first of a series of 3 articles showing how freshwater fish may be propagated for commercial, sporting, or private purposes. The present article discusses the methods of constructing and maintaining artificial fish ponds and the improvement of natural lakes and streams. The food chain of fish is described and the technique given for introducing aquatic plants and animals and for the control of predators.—T. T. Munger.

8965. MCLEOD, A. M., and PAUL NEMENYI. An investigation of fishways. *Bull. Univ. Iowa Stud. Engineer.* 24: 1-63. 23 fig. 1939-1940.—The bulletin deals with the hydraulics of fishways and the gathering of empirical data from observations of fish movement. Fishways for salmonines, cyprinides, and eels are given consideration. Fishways from a hydraulics standpoint are velocity and elevation differences between pools that afford the best possible relation to the effort which the fish is capable. Forty models were tested in the laboratory. Those showing best qualities were constructed full scale and used in field experiments in the Iowa River. The full scale models were operated in pairs for comparison. All were 24 feet long and set at a 1:4 slope. Water velocities were calibrated and unfavorable velocity distribution, strong vortices, and surging were noted. Most models were compared on the basis of the Chezy coefficient. Any single numerical characteristic is insufficient and the final test is the success of the fishway in actual use. Small trout were used to check the model fishways. The paired obstacle types were negotiated over a wide range of flow depth. The overfall models became impassable at high and low flow depths. In placing baffles the zigzag arrangement is least desirable, the fish preferred a straight channel requiring uniform effort in one direction. The Denil type is superior as an energy dissipator, has wide adaptability in construction and is adaptable to great headwater fluctuations. The movement of fish through the fishways was also correlated with climatic conditions.—S. J. Hutchinson.

8966. LUNZ, G. ROBERT Jr. (*Charleston Mus., S. C.*) *Polydora*, a pest in South Carolina oysters. *Jour. Elisha Mitchell Sci. Soc.* 57(2): 273-283. 1 fig. 1941.—Small dark colored blisters appearing on the inner surface of the valves of an oyster are caused by an annelid, *Polydora ciliata*. The abundance and distribution of *Polydora* is given. Observations and exptl. work show that oysters infested with *Polydora* are less fit than those not infested. In addition, mud blisters tend to restrict the living space of the oyster and cause it to expend needless energy forming blisters to wall in the causative organism. Blisters do not render oysters unfit for human consumption but make them unsightly and less salable. About 40% of the oysters in S. Carolina are infested with *Polydora*, but the % of infestation is not increasing. Infestation is more prevalent below low-water mark, on soft muddy bottom, in areas of low salinity. *Polydora* is almost universally distributed. *O. virginica* is infested throughout its entire range.—G. R. Lunz, Jr.

8967. RANEY, EDWARD C. (*Cornell U., Ithaca.*) The summer food and habits of the chain pickerel (*Esox niger*) of a small New York pond. *Jour. Wildlife Management* 6(1): 58-66. 1 fig. 1942.—The stomach contents of 104 young pickerel consisted of fishes, 33% by volume; insects, 64%; and Crustacea 2.3%. In June, micro-crustaceans were eaten along with insects, mostly mayfly and dragonfly nymphs, and some fishes (young golden shiners and common sunfishes). During Aug. and Sept. the 2 spp. of fishes mentioned above were eaten, and insects were still important items. No crayfishes were eaten by young pickerel. Stomachs of 145 juvenile and adult pickerel contained fishes, 47%; crayfishes 42%; and insects, 9%. Of the fishes eaten golden shiners and bullheads were most important although common sunfishes, yellow perch, and pickerel were also eaten.—E. C. Raney.

8968. RANEY, EDWARD C., and ERNEST A. LACHNER. (*Cornell U., Ithaca.*) Studies of the summer food, growth, and movements of young yellow pike-perch, *Stizostedion v. vitreum*, in Oneida Lake, New York. *Jour. Wildlife Management* 6(1): 1-16. 4 fig. 1942.—Stomachs of 495 young pike-perch contained food of which fishes were most important, forming 92.9% by volume. The remainder was largely invertebrates. The fishes eaten were mostly young

of the year, and those most commonly taken were Johnny darters (16%), common sunfishes (14%), and yellow perch (10%). As a group the minnows also were of importance (11%). Insects, largely mayflies and caddis flies, and crustaceans made up the bulk of the invertebrate food. No crustaceans were found in stomachs after the last of July. Some 65 stomachs of larger specimens, all of which had passed through at least one winter, were examined of which 38 contained food. Fishes were most important in their contents (80.6% by volume); insects made up 12.2%; and amphibians, scuds, mollusks, roundworms, and plants were present in smaller quantities. Yellow perch were most commonly eaten (32%). By Oct. 24, the young had attained an average total length of 5.25 inches. At this time the largest specimen measured was 7, and the smallest was about 4.25 inches.—E. C. Raney.

8969. SMITH, OSGOOD R., and PAUL R. NEEDHAM. Problems arising from the transplantation of trout in California. *California Fish and Game* 28(1): 22-27. 2 fig. 1942.—This paper presents various reasons for poor results from planting trout in waters which already support trout populations. Frequent failures seem to be related to poor hatchery stocks, racial characteristics, low fertility, planting methods, environmental resistance, or naturally high mortalities, rather than differences between species of trout. Specific examples, largely from published accounts, are given to illustrate low returns from planted trout and the factors which may account for them. Research must be carried on to make better use of hatchery fish because stocking will always be needed in many mountain lakes which have no natural spawning grounds and in areas subjected to heavy angling.—Authors.

8970. WALES, J. H. Carp control work in Lake Almanor, 1941. *California Fish and Game* 28(1): 28-33. 3 fig. 1942.—If the undesirable fish in lakes cannot be removed by poisoning the entire water or if these fish have some forage value, they may be controlled by poisoning with derris or timbo powder. A method of poisoning the spawning areas of carp is described. Fish may be trapped in coves by distributing the poison across the mouths of such coves. Water temps. should be between 75° and 85° F. Carp eggs were being killed by fungus to the extent of 75%.—J. H. Wales.

8971. WENT, ARTHUR E. J. Salmon of the Ballisodare River. II. Age and growth. *Sci. Proc. Roy. Dublin Soc.* 22(35): 327-344. 1941.—Sets of scales and data were collected from the Ballisodare net fishery in 1938 and 1939. The majority of the salmon had migrated as 1- or 2-yr. smolts. Grilse, which formed 80% of the total catch, were heavy fish, the condition coefficient being the highest yet recorded for any river adequately investigated. Checks were observed in the scales of salmon taken in both 1938 and 1939 corresponding to the middle of the period of growth for the 1937 season. The scales of some fish showed growth in fresh water prior to their migration as smolts. Others showed little or none. The results led to the suggestion that the parr must attain some physiol. condition associated, at least as an index, with a minimum size, apparently about 4.3 inches, before the smolt migration takes place. Grilse had a greater length at the end of the first sea winter than any other age group. In the 2-yr. smolt class the length at the end of the 2d winter was found to exceed that at the end of the 1st winter by 2.5 inches. In the grilse there appears to be a close relationship between the smolt length, the length at the end of the first sea winter, and the length at capture.—H. H. Poole.

WILDLIFE MANAGEMENT—TERRESTRIAL

(See also Entries 9926, 11407, 11435, 11477)

8972. BAUMGARTNER, F. M. (*A. and M. Coll., Stillwater, Okla.*) An analysis of waterfowl hunting at Lake Carl Blackwell, Payne County, Oklahoma, for 1940. *Jour. Wildlife Management* 6(1): 83-91. 4 fig. 1942.—2,081 ducks and 5 geese were bagged in 1,252 hunters' days, a daily av. of 1.67 birds per hunter. Hunting pressure was heaviest during Oct. and the first half of Nov.; it declined sharply after the opening of the quail season on Nov. 20. Over-crowding on Sundays materially reduced the av. daily kill. Hunters were, in general, satisfied with controlled hunting. 16 spp. of game ducks and 2 spp. of geese were taken.

Almost 90% of the kill consisted of the green-winged teal, pintail, mallard, ring-necked duck, baldpate, gadwall, and redhead. With a few marked exceptions the kill records expressed fairly accurately the numerical relations of the waterfowl. Listed in order of importance to the hunter over the entire season were the pintail, green-winged teal, mallard, baldpate, gadwall, and ring-necked duck; the others were of minor significance. Data collected on crippling losses suggest that one duck was lost for every bird brought to bag. The total mortality was estimated to be 2.8% of the waterfowl population of the lake. Hunting did not prevent the closed half of the lake from satisfactorily functioning as a feeding and resting refuge for several thousand waterfowl throughout the season. The controlled hunting was a financial success.—F. M. Baumgartner.

8973. BEER, JAMES R., and WAYNE TIDYMAN. (Washington State Coll.) The substitution of hard seeds for grit. *Jour. Wildlife Management* 6(1): 70-82. 6 fig. 1942.—In an examination of the stomach contents of 323 specimens, including 9 game, and 1 passerine, species, substitution of hard seeds for grit was found to occur. This was noted in *Dendragapus obscurus*, *D. fuliginosus*, *Bonasa umbellus*, *Colinus virginianus*, *Lophortyx californica*, and *Phasianus colchicus*. Substitution was not found in *Lagopus leucurus*, and *Perdix perdix* and was doubtful in *Canachites franklini* and *Corvus brachyrhynchos*. Factors influencing the habit are shape, hardness and availability of seeds and the food preferences of the birds.—Authors.

8974. BROWN, LEO. (State Fish Hatchery, Pratt, Kansas.) The management of farm wildlife. *Trans. Kansas Acad. Sci.* 44: 381-388. 1941.—Wildlife is an organic resource and can be managed on a sustained yield basis. Farm wildlife is a product of the land, and management practices are of vital importance to increased production. Wildlife cannot be considered separate and apart from its environment; as a consequence, its management must make provisions for a satisfactory environment. Wildlife environments in most cases have values in themselves in addition to their value to wildlife. Income from wildlife may in some instances be adequate to offset carrying charges accruing on a wildlife environment that is being managed to increase wildlife production. The ecology of threatened species should be worked out with special emphasis on the factors of disease, competition, harvesting of game crop and maintenance of favorable habitats.—Auth. summ.

8975. BUSS, IRVEN O. (Wisconsin Conserv. Dept.) Sex ratios of Wisconsin pheasants. *Wisconsin Conserv. Bull.* 6(5): 4-6. 1941.—Observations made from Dec. 15, 1940 to Mar. 15, 1941 on the number of pheasant cocks and hens in all 50 counties in Wisconsin show a sex ratio of one cock to 4.5 hens in the State. Variations from this ratio occurred in each county, and from month to month during the period of recording. These ratios are accurate as observed ratios only.—Herbert McCullough.

8976. COOK, NEWELL B. (Utah Fish and Game Commiss.) Opportunities for cooperation between the state and federal government in wildlife restoration. *Idaho Forest.* 21: 13, 45. 1939.—In Utah the land is distributed disproportionately between Federal, State and private ownership, about 80% being publicly owned, the greater part of which is administered by the Division of Grazing of the Dept. of Interior. Consequently, game management as a state function must be coordinated with that of other agencies in order to carry out effectively a successful fish and game program. A small elk herd is administered by the U. S. Forest Service, State Fish and Game Dept. and livestock men of nearby localities. Success has been apparent in the increase in size of herd as well as annual kill. Utah will continue to seek and accept help which will better fish and game conditions of the state.—John Ehrlich.

8977. COX, W. T. The fight for the woodland caribou. *Amer. Forests* 47(2): 55-57, 93-94. 1941.—Popular account of the depletion of this species, especially in Minnesota, and of its re-introduction. Some of the imported animals are reproducing.—Courtesy Wildl. Rev.

8978. DALE, FRED H. (Michigan Dept. Conserv.) Influence of rainfall and soil on Hungarian partridges and pheasants in southeastern Michigan. *Jour. Wildlife Management* 6(1): 17-18. 1942.—Hungarian partridges (*Perdix per-*

dix) increased on heavy-textured soils of southeastern Michigan from 1916 to 1936 when summer rainfall averaged 8.17 inches. During the same period pheasant (*Phasianus colchicus*) populations remained low. From 1937 to 1940 when summer rainfall varied from 9.14 to 19.82 inches, Hungarian partridges decreased in numbers while pheasants became more abundant.—F. H. Dale.

8979. DEERWESTER, THERMAN. (Wisconsin Conserv. Dept.) Cooperative snowshoe hare control project. *Wisconsin Conserv. Bull.* 6(4): 19, 29. 1941.—In 1938 a cooperative snowshoe hare control project was begun by the U. S. Forest Service, U. S. Fish and Wildlife Service (then the Biological Survey) and the Wisc. Conserv. Dept. to find means of protecting newly planted forests from damage by hares. Young evergreen trees are damaged or eaten during periods of the hare population cycle when these animals are present in great quantities. Two means of control have been tried experimentally: snaring and live trapping reduces the number of hares in and around a young plantation until their damage becomes negligible, snaring being the most economical means; repellents have been used successfully for periods of 1 yr., but are impractical because of labor cost for the respraying that is necessary in subsequent years. Other methods are being considered for experimentation.—Herbert McCullough.

8980. EINARSEN, ARTHUR S. Suggestions on management of small game in Oregon. *Oregon Agric. Exp. Sta. Circ.* 140. 1-18. 3 fig. 1941.—This publication is based on the findings of the Cooperative Wildlife Research Unit. It reviews conservation activities and hunter practices in Oregon, and points out how greater public participation can aid the State game department in maintaining shootable small game. Suggestions are given for the selection and care of game-management areas with special reference to the cruising tendencies of the species for which they are intended: ring-necked pheasant, bob-white, and valley quail, in particular. Mention is made also of blue and ruffed grouse and of the Hungarian partridge. Sections of the circular are devoted to aiding game in winter, controlling predators, protecting game, increasing water facilities, improving waterfowl food supply, and managing duck ponds and marshes.—Courtesy Wildl. Rev.

8981. GABRIELSON, IRA N. (Bur. Biol. Surv., U. S. Dept. Agric.) Opportunity for cooperation between federal and state governments in wildlife restoration. *Idaho Forest.* 21: 12, 46. 1939.—The Bureau of Biological Survey (now Fish and Wildlife Service, U. S. Dept. Int.) cooperates in law enforcement, provides refuges and sanctuaries, and conducts work in predator and rodent control. The Pittman-Robertson Act makes it possible for the Federal Government to aid the states directly in approved projects benefiting wildlife. Since well trained men are scarce, the Biol. Survey, helped by universities and the American Wildlife Inst., has organized ten cooperative wildlife research units which have as part of their undertaking the training of competent men. The Federal and State Governments should take advantage of all cooperation possible to accomplish efficiently the purpose of their organizations.—John Ehrlich.

8982. GOODRUM, PHIL. (Texas Game, Fish and Oyster Commiss., Austin.) Texas Federal Aid Project 1-R. *Texas, Game, Fish, and Oyster Comm. Quart. Progr. Rept. Div. Wildlife Restor.* Apr., May and June. 1-9. Map. 1941.—Preliminary manuscripts on the distr. and status of Texas game species are now being assimilated for publication. Three new Pittman-Robertson proj. have been approved—exptl. mgmt. of the lesser prairie chicken [*Tympanuchus pallidicinctus*] of the Texas Panhandle, of Attwater's chicken [*T. cupido attwateri*] of the gulf coastal prairies, and development and management of refuges for migratory waterfowl. A life history study of the Rio Grande turkey [*Meleagris gallopavo merriami*] has been instigated in S. W. Texas. A census of turkeys is possible in winter by listening to their wingbeats as they fly to roost. To date *Vicia texana*, *Limnodea arkansana*, *Setaria grisebachii*, *Panicum filipes*, *Solanum*, and insects have been found to be favorite foods. A life history study was also begun of the white-winged dove [*Melopelia a. asiatica*] due to this bird's decrease in Texas during the last 2 decades from approx. 2,000,000 to 500,000 birds. Major limiting factors are over-

hunting, the replacing of brushlands by agricultural crops, and predation by green jays [*Xanthoura luxuosa glaucescens*] and grackles [*Cassidix m. mexicanus*]. Approx. 500 white-winged doves were banded in the Rio Grande Valley. *Brasenia schreberi* can be transplanted by submerging the entire plant in boxes containing soil taken from the plant's original habitat. In 1940-41, 64 trappers in Angelina Co. took 1,911 furs bringing a total income of \$2,652.14.—H. R. Siegler.

8983. HAMERSTROM, F. N. Jr., FRANK HOPKINS, and ANTON J. RINZEL. An experimental study of browse as a winter diet for Prairie Chicken. *Wilson Bull.* 53(3): 185-195. 2 fig. 1941.—38 wild-trapped Prairie Chickens (*Tympanuchus cupido americanus*) were used in expts. during parts of 2 winters. Buds and catkins of the 6 most commonly used (in Wisconsin) browse plants, plus 5 others and 2 wild fruits, made up the browse diet; controls ate the same foods plus 7 cultivated grains; one lot was fed first on grains alone, then on browse alone. For comparison of results, several different time periods have been converted to uniform periods of 2 weeks each: the birds on browse alone lost an average of 12.9% of body wt., and 3 starved to death; addition of grains caused a recovery of 7.6%; birds on grains alone and browse plus grains lost only 1.5% and 0.6%, respectively. Considering also the food habits and distribution of wild Prairie Chickens, it is suggested that small numbers may be able to supplement a browse diet with an uncertain supply of weed seeds, but that winter grains are necessary to have Prairie Chickens in numbers in the north central states.—F. N. Hamerstrom, Jr.

8984. HARRILL, L. R., et al. The wildlife conservation program of the 4-H clubs in North Carolina. *North Carolina Wildl. Conserv.* 5(4): 1-16. Illus. 1941.—The whole issue is devoted to 4-H club conservation work, and is contributed to by ROSS O. STEVENS and by several county agents. The clubs make surveys of the physical features, vegetation, and wildlife of farms. An outline of the work is given, the value of a wildlife camp as an incentive is made clear, and results for a number of counties are summarized.—Courtesy *Wildl. Rev.*

8985. HEIN, EDWARD N. (Wisconsin Conserv. Dept.) Gunless killing. *Wisconsin Conserv. Bull.* 6(2): 24-26. 1941.—On 27 miles of U. S. Highways 12 and 16 in Juneau county, Wisc., the following death tolls were found over a 10-month period: cottontail rabbit 105, squirrel 69, muskrat 21, skunk 16, ringneck pheasant 50, gophers 52, snakes 81, turtles 88, and other wildlife in lesser quantity. The kill of cats and dogs can only be estimated.—Herbert McCullough.

8986. HEIN, EDWARD N. (Wisconsin Conserv. Dept.) Wildlife management. *Wisconsin Conserv. Bull.* 6(5): 30, 31. 1940.—A policy of preservation alone is not sufficient in wildlife management. Studies of conditions necessary to maintain the different kinds of wildlife should be made. Attempts at cultivation of wild flowers should be encouraged to promote conservation.—Herbert McCullough.

8987. HESSELSCHWERDT, R. E. (*Illinois Nat. Hist. Surv., Urbana*.) Use of den boxes in wildlife restoration on intensively farmed areas. *Jour. Wildlife Management* 6(1): 31-37. 4 pl. 1942.—One year's study of 56 den boxes placed in fencerow trees, hedges, and woodlots on a 4-square-mile area of the black soil cornbelt prairie of central Illinois has shown that such boxes are an aid to fox squirrels (*Sciurus niger*), screech owls (*Otus a. asio*), and sparrow hawks (*Falco s. sparverius*). 7 spp. used the boxes during the year. Constructed of rough cypress lumber, the boxes were 3 in. deep and 10 in. square inside with openings 5 in. in diam. All were located in a region where natural tree cavities are scarce. Greatest utilization occurred in March, April, and May during the nesting season and least during the summer. Fox squirrel distr. was influenced by the sites of the boxes. 5 litters of young fox squirrels born in the boxes averaged 3.2 individuals. 5 broods of screech owls totalled 22 young, or 4.4 per brood. Sparrow hawks used the boxes for nesting only. 6 opossums resorted to the boxes for daytime shelter. The boxes were an important aid in studying the food and nesting habits and populations of the spp. using them.—R. E. Hesselenschwerdt.

8988. HIGHBY, PAUL R. (*St. Paul, Minnesota*.) Managing our muskrat resource. *Conserv. Volunteer* 2(7): 17-20.

1941.—Chiefly a compiled account of the life history and of management suggestions.—Courtesy *Wildl. Rev.*

8989. JENNINGS, DOLF. (*Kansas State Coll.*) Fall food habits of the bobwhite quail in eastern Kansas. *Trans. Kansas Acad. Sci.* 44: 420-426. 1941.—Stomach contents of bobwhite (*Colinus virginianus*), taken during the hunting season in 1939 and 1940, included seeds from 28 families including 50 spp. of plants; insects represented 15 families; some snails and a considerable number of millipedes and other arthropods were eaten. The preferred foods were seeds of kafir, sunflower, and annual ragweed.—F. C. Gates.

8990. JENNINGS, DOLF. (*Kansas State Coll.*) The food of twenty-two mourning doves taken during the 1940 hunting season. *Trans. Kansas Acad. Sci.* 44: 427-428. 1941.—Results from the limited number of mourning doves (*Zenaidura macroura*) seem to indicate that the doves in this area feed on a limited number of readily available fall foods, utilizing especially seeds from grasses and spурges.—F. C. Gates.

8991. KARTCHNER, K. C. Elk introduction to Arizona. *Arizona Wildl. and Sportsman* 2(5): 2, 11. 1940.—The native Merriam's elk was exterminated by 1898. Introduction of Rocky Mt. elk was begun in 1913 and continued for a decade or more. The methods used are described. By 1940 the animals numbered about 4,000. Hunting under permit is allowed but complaints of damage to crops are becoming more numerous.—Courtesy *Wildl. Rev.*

8992. KIRKPATRICK, R. C. (Wisconsin Conserv. Dept.) Effects of fires on wildlife. *Wisconsin Conserv. Bull.* 6(5): 28-30. 1941.—Forest fire control is essential to wildlife conservation. Burning of marsh areas in spring disrupts the breeding season of various low nesting birds by destroying nest building material and eggs, and exposing the parent bird to predators. Burning is not efficient in destroying weeds and weed seeds over a period of time. Birds which prey on insects are driven off by burning, leaving to thrive the insect pests which are not harmed. Fire denudes land, permitting erosion which affects not only deer and other land forms but fish as well.—Herbert McCullough.

8993. LINDUSKA, J. P. (Dept. Conserv., Lansing, Mich.) A new technique for marking fox squirrels. *Jour. Wildlife Management* 6(1): 93-94. 1 pl. 1942.—Fish fingerling tags applied to the outer toe of the hind foot.—W. L. McAtee.

8994. MAKAROV, V. N. Natural preserves of the U.S.S.R. The Popular Science Library. State publications, collective and Soviet farm literature. 153p. 2 col. pl., 85 photographs. Moscow. 1940.—This is the first book on the natural preserves of the U.S.S.R. In it are described most of the 47 sanctuaries for wildlife and the natural flora of the Soviet Union. These sanctuaries are scattered throughout the Union from Crimea to Kamchatka, covering altogether 10,071,700 hectares. The preserves are classified according to their geographical location as follows: (1) Plain-forest, (2) mountain-forest, (3) forest-steppe, (4) steppe, (5) insular, (6) semi-arid zone, and (7) arid zone. Several preserves are devoted exclusively to certain animals, such as the mink. Some are maintained strictly in a natural state for scientific and educational purposes; from others certain economic benefits are derived. A chapter is devoted to each preserve. The author describes briefly the soil, and geographic and climatic conditions, gives some data concerning the natural history of the region, sometimes several centuries back, mentioning many extinct animals. Particular attention is paid to restoration of rare species and acclimatization of introduced wildlife in different regions. The author gives a prominent place to statistics, presenting the latest available figures on the numbers of species, colonies, nests, etc. Food supplies and natural phenomena affecting wildlife, such as floods, droughts, etc., are also considered. Plant associations of each sanctuary are fully described in relation to wildlife.—Vera Turin.

8995. PEARSON, ALLEN M., and GEORGE C. MOORE. Dove sex ratio found almost evenly divided. *Alabama Conserv.* 1(7): 8. 1941.—Tabulation of sex determinations of 3,491 mourning doves by months; the av. is 51.82% males.—Courtesy *Wildl. Rev.*

8996. PLATTES, CYRIL. (St. Paul, Minnesota.) Refuge leader of the nation. *Conserv. Volunteer* 2(7): 55-58. 1941.—Minnesota has 188 refuge areas, totaling 3,335,505 acres

and prohibits the shooting of waterfowl upon open water—a provision applying to an additional 3,000,000 acres. It has the largest single State sanctuary, 1,290,000 acres in the Superior Natl. Forest. However, small refuges are more desirable and they should be carefully distributed. Present management is described and recommendations made as to the future. 7 State-owned combined refuge and public shooting areas are listed. "Development of Minnesota game refuges is progressing to the financial limit. Foremost in the minds of administrative officials is the basic function of a refuge: To produce an outflow of game to surrounding ranges. They are mindful that this outflow can only arise from population pressure within a refuge, and must necessarily vary with the mobility of the species to be given most protection. Therefore, they are viewing Minnesota's refuge program critically with a view of obtaining improved refuge patterns and better conditions for wildlife all around."—*Courtesy Wildl. Rev.*

8997. RYSGAARD, G. N. (St. Paul, Minnesota.) A short history of waterfowl. *Conserv. Volunteer* 2(9): 75-79. 1941.—Effects of drainage, drought, botulism, lead poisoning, and shooting, as affecting the total, and the Minnesota, populations. A low was reached in 1935. There has been some increase but at the rate of a 5% annual increase, it would require 14 yrs. to restore the population to 50,000,000 birds, $\frac{1}{2}$ of that of 1930, which was considered dangerously low.—*Courtesy Wildl. Rev.*

8998. SCHILLING, E. A. Wildlife management. *Florida Game and Fish* 2(5): 12-14. 1941.—Statement as to refuges in national forests which have proved successful in maintaining game populations within their boundaries but not in restocking surrounding areas. Disadvantages of the refuges are analyzed and statement is made as to the measures taken to get better results from wildlife management areas. 8 such tracts totaling some 2 million acres are now established in the national forests of the Southeastern States. They have been under administration from 3 to 5 years; some of the results are cited; the outlook appears favorable.—*Courtesy Wildl. Rev.*

8999. SHADLE, ALBERT R., and DONALD STULLKEN. (U. Buffalo.) The deer of Allegany State Park, New York. *Jour. Wildlife Management* 6(1): 27-30. 1942.—Observations from July, 1936 to Aug., 1940. A marked increase in white-tailed deer (*Odocoileus v. virginianus*) has been due to migration from Pennsylvania, practical absence of predators, and protection from hunters. These conditions have resulted in increase of deer beyond winter carrying-capacity of the area, localized overbrowsing of winter foods and some summer foods, distinct browse damage to much young native and introduced evergreen growth, and death of a large number of deer, particularly the immature ones, in the winter of 1940. Recommendations:—Determination, by deer-management expert, of winter carrying capacity of the Allegany State Park Area and approx. number of overpopulation now present; reduction of present herd to determine winter carrying-capacity, either by a pre-season community deer drive to force excess deer out of Park area, thus available to hunters (method advised), or by rangers and wild-life management experts. Other possibilities are: control by ranger-directed hunting parties (impractical), or open season (very undesirable) under strict regulations as to ages, sex, and numbers to be taken.—A. R. Shadle.

9000. SHELFORD, U. E. (U. Illinois.) The nature sanctuary idea. *Audubon Mag.* 43(6): 503-510. 2 pl. 2 fig. 1941.—Ecologically self-sufficient natural biotic communities are necessary for the study of many biological problems. These may sometimes be attained by instituting buffer zones around completely protected nuclei such as national parks which now generally inadequately protect large ungulates and carnivores. There is a shortage of grassland, lowland deciduous forest (Tennessee), and nature flood plain (Mississippi valley) reservations. Mexican and Central American parks are in no better condition than those of the U. S., due partly to selection of areas for scenic and recreational values rather than for animal protection. Proposed international parks are listed.—J. A. Gray, Jr.

9001. SPOONER, CHARLES S. Jr. (Illinois Dept. Conserv., Springfield), and LEE E. YEAGER (Illinois Nat. Hist. Surv., Urbana). Potential wildlife habitat on the Illinois

prairie and some problems of restoration. *Jour. Wildlife Management* 6(1): 44-54. 1942.—On Illinois black prairie farms scarcity of cover is the chief deficiency of the upland game habitat. To measure this deficiency, and to determine the availability and cost of developing land for wildlife refuges on the prairie, a Federal Aid project was organized. Land for refuge development was found to be available, without purchase, in scattered tracts and obtainable through long-term easements. Such areas consist of woodlots, eroded fields, drainage ditches, strips along hedgerows, old orchards, gravel pits, and undrained prairie. Development included posting, fencing, planting, and certain erosion-control measures. The cost will be about \$1.50 per acre per year over a 10-yr. period, but succeeding projects should show a materially lower expenditure. Taxes amount to about \$1.00 per acre per year and are paid by the owner. Reasonable flexibility in regulations appears to be necessary to insure ample availability of land for refuges on the prairie, and an orderly harvest of game to maintain interest of the land-owners. The plan shows promise in the Illinois grain belt, but some of its applications must be further analyzed before its entire success is proved.—C. S. Spooner, Jr.

9002. STONER, DAYTON. Bird casualties on the highways. *Univ. State New York Bull.* 27(7): 229-232. 1941.—Mainly notes on animals seen dead along highways in four round trips from Albany, N. Y., to Iowa City, Iowa. Birds totalled 1,781 out of 2,975 freshly killed vertebrates. Suggestions are made as to use of some of the victims for biological specimens.—*Courtesy Wildl. Rev.*

9003. SWANSON, G. A. When and why are pheasants abundant? *Minnesota Conserv.* 59: 20, 21. 1938.—The reproductive potential of the ring-necked pheasant is considerably higher than that of most game birds. The various mortality factors which combine to cut down the increase in Minnesota of this species are taken up in detail. Nesting failures are considered to be the most important cause of mortality, and the outstanding cause of nesting failures is interference by man, the destruction of nests by mowers during haying operations being by far the most important loss. In every extensive study of pheasant nesting which has been carried on, over half of the losses of birds have been found to be due to interference by man. An explanation of and plea for the use of a flushing bar to prevent destruction of incubating pheasants during mowing operations is included.—*Courtesy Exp. Sta. Rec.*

9004. WARD, JUSTUS C. (Fish and Wildlife Serv., Denver, Colo.), MALCOLM MARTIN, and WARREN ALLRED (Wyoming Game and Fish Commiss., Cheyenne). The susceptibility of sage grouse to strichnine. *Jour. Wildlife Management* 6(1): 55-57. 1942.—Captive birds did not accept strichnine-poisoned grain, but when fasted took small quantities of strichnine-poisoned alfalfa. Evidently there would be no danger to sage grouse from grain baits distributed for rodent control but care should be exercised in using poisoned alfalfa in jackrabbit control. Birds force-fed poisoned grain could be killed with doses of 50 mg/kg or even less. Strychnine administered by stomach tube killed at 50 and 100 mg/kg; birds survived 35 mg/kg and lower doses. By intraperit. injn. 10 mg/kg killed, 5 mg/kg did not. —J. C. Ward.

9005. WEBB, WILLIAM L. (N. Y. State Coll. Forest, Syracuse.) A method for wildlife management mapping in forested areas. *Jour. Wildlife Management* 6(1): 38-43. 2 pl. 1942.—The mapping method described is based on the study of random samples of the environment. Data taken in the field include notes on the presence and relative density of each plant species within the area of the sample. These data may be summarized in the form of species-distribution maps that show the presence and abundance of important plants in graphic form. The preferred method of analyzing the data, however, is a numerical designation called the rating which expresses the distribution and abundance of each species. Careful and scientific analysis of the environment is necessary to scientific management of a wildlife population.—W. L. Webb.

9006. WEBB, WILLIAM L. (New York State Coll. Forest, Syracuse.) Notes on a method for censusing snowshoe hare populations. *Jour. Wildlife Management* 6(1):

67-69. 1 fig. 1942.—A proposed method for determining the population of *Lepus americanus* by a modification of King's "strip" method. The area is gridded by census lines $\frac{1}{4}$ -mile apart. The flushing distance (distance from observer to the hare) and jumping angle (angle from census line to the hare) are detd. in the field for every hare seen on the census line; and the width of the strip is calculated from the average flushing distance and the av. jumping angle: Population = $AZ/2 XY \sin D$, where A is the total area in square yards, Z the number of hares seen, X the length of census line in yards, Y the av. jumping distance in yards, and $\sin D$ the natural sine of the av. jumping angle. Results

of 5 censuses on the same area in St. Louis County, Minnesota, show plausible results.—W. L. Webb.

9007. ANONYMOUS. Michigan otter still a puzzle. *Michigan Conserv.* 10(5): 5. May 1941.—An open season, concurrent with that on beavers, yielded only 266 otter pelts which brought from 8 to 12 dollars each. The plan is to be tried another year to learn whether otter trapping is of material value to the citizens and whether the otter population justifies cropping. Study of the food of 229 individuals revealed in their stomachs, one-quarter game and pan fishes, one-half forage fishes, and the remainder largely crayfishes, frogs, and insects.—Courtesy *Wildl. Rev.*

BIOLOGICAL ABSTRACTS

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GENERAL BIOLOGY

Editors: A. H. GRAVES, *Plant*; C. A. KOFOID, *Animal*

(See also Entries 11521, 11524, 11542, 11667, 11711, 11861, 12586, 12621, 12622, 12624, 12625, 13073, 13193, 13206, 13349, 13424, 13580, 13722, 13726)

PHILOSOPHY OF BIOLOGY

11498. BENTLEY, ARTHUR F. The factual space and time of behavior. *Jour. Philosophy* 38(18): 477-485. 1941.—An argument against the formalization of space-time and for a purely empirical approach to phenomena appearing in a space-time setting. Biology and psychology must be taken as part of a larger manifold of interrelationships of organism to environment, in which the segregation of environment-to-species or environment-to-individual relationships is an artificial one that may be justified by practical reasons, but does not correspond to reality. The same is true of subject and object, or of separate social sciences.—*L. J. Lafleur*.

11499. LAFLEUR, LAURENCE J. Conceptual relativity. *Jour. Philosophy* 37(16): 421-431. 1940.—There is a relativity of concepts as well as relativity in other fields. In language, as distinguished from reality, some aspects of a situation are segregated as being more important than others, and the whole situation is then described in terms of the elements selected. As the selection is arbitrary, there are an unlimited number of different descriptions of a given reality, in apparent but not in real contradiction to each other. The problem of individuality is a case in point, either the individual, a larger whole such as the universe, or analytical elements such as atoms, molecules, or cells may be chosen as fundamental. In each of the 3 fields of philosophy, psychology, and biology the 3 interpretations may be found: in each one a different interpretation has secured predominance. In biology the analytical method is predominant, and the synthetic rarely found. In reality the 3 are equally true and mutually compatible.—*L. J. Lafleur*.

11499A. LEY, WILLY. The days of creation. x+275p. 36 fig. Modern Age Books: New York, 1942. Pr. \$2.75.—A brief popular history of the earth and its inhabitants, so arranged that each chapter corresponds to one of the days in the Mosaic account of creation. Beginning with a short account of the galaxies and of the formation of the solar system the narrative proceeds through the formation of the seas on to the origin of life. The emergence of land plants and animals is next described and the history of the amphibians, reptiles, birds and mammals traced. The emergence of man to a position of power over the rest of creation is recounted under the heading, "The Seventh Day," in a chapter optimistically labelled "The consolidation of brainpower."—*Conway Zirkle*.

11500. McDougall, W. The riddle of life: a survey of

theories. 279p. Methuen: London, 1939. Pr. 7s 6d.—The problem of this dissertation is the differentiation between living and material things. Most of the work is devoted to a critical summary of the various approaches to the problem. The A. discusses briefly mechanical biology, emergent evolution, and holism. The conception of a living organism which he himself prefers is that of a hierarchy of monads in which physical and psychical activities, though connected with each other, are radically different. "The psychical factor in the life of organisms is of their very essence, and throughout the scale of organic evolution it has become of increasing efficiency."—*F. W. Finger* (in *Psychol. Abst.*).

11501. PIKE, F. H. (Columbia U.) The thermodynamic probability of living organisms. *Anat. Rec.* 81(4): suppl. 114. 1941.—An abstract.

11502. PIKE, F. H. (Columbia U.) The improbability of determinism in biology. *Anat. Rec.* 81(4): suppl. 115. 1941.—An abstract.

TAXONOMY AND NOMENCLATURE

11503. EWAN, JOSEPH. (U. Colorado.) Isotype versus Co-type as designations for duplicate type. *Chron. Bot.* 7(1): 8-9. 1942.—Favors use of "isotype."—*L. J. Gier*.

11504. MARTIN, G. W. (State U. Iowa.) Respecting descriptions in Latin. *Mycologia* 33(6): 667-669. 1941.—Reply to a proposal to abandon the requirement that descriptions of new groups be accompanied by a Latin diagnosis, defending the rule and urging that it be followed.—*G. W. Martin*.

11505. EDITORIAL. The future of our large institutions of systematic botany. *Chron. Bot.* 7(2): 61-64. 1942.—An answer to an article criticizing the aims of research especially in Kew Gardens. There is yet much taxonomy to be done and the workers in pure and applied taxonomy have and should continue to have different aims.—*L. J. Gier*.

EXPLORATION, EXPEDITIONS, ETC.

11506. JOHNSON, OSA. Four years in paradise. 345p. 74 fig. J. B. Lippincott Co.: Philadelphia, 1941. Pr. \$3.50.—This is the story of Martin and Osa Johnson's sojourn at Lake Paradise in an old crater in Northern British E. Africa beyond Mt. Kenya. They resided here 4 years making films and stills of the animals of this wild region as a permanent record of the varied wild life, lions, elephants, rhinos, baboons, leopards, hyaenas, zebras, giraffes, and antelopes. Their observations were made from blinds at water holes

and platforms in the forest, by day and night. Mrs. Johnson's records contain many careful and interesting observations on the behavior of African wild life in nature at the water holes, on the plains, and in the forest. She was especially interested in the interplay of the many species, in their care of their young, their conduct in the herd, and their reactions to scent of man, and to alarms. The book is an encyclopedia of African natural history.—C. A. Kofoid.

11507. TOXOPEUS, L. J. (*Buitenzorg*) Nederlandsch-Indisch Amerikaansche Expeditie Naar Nederlandsch Nieuw-Guinea (3e Archbold-Expeditie Naar Nieuw Guinea 1938-'39) Lijst van verzamelstations. [Netherlands Indian-American Expedition to Netherlands New Guinea (3rd Archbold Expedition to New Guinea 1938-'39) List of Collecting Stations.] *Treubia* 17: 271-279. Map. 1940.

INSTITUTIONS, ADMINISTRATION

11508. HAMILTON, JOSEPH G. (*U. California*) Medical-physics laboratory of the University of California. *Sci. Month.* 54(2): 192-195. 3 fig. 1942.—A brief description of this new laboratory, with list of the members of the staff and discussion of the general type of expt. which is to be carried out.—F. R. Hunter.

11509. EDITORIAL. Plant Science institutions, stations, museums, gardens, societies, and commissions in Central and South America. *Chron. Bot.* 7(2): 49-61. 1942.—Listing of the organized and private institutions of 36 countries and colonies brought up to date.—L. J. Gier.

MUSEUMS, BOTANICAL AND ZOOLOGICAL GARDENS, AQUARIA, ETC.

11510. TRAUB, HAMILTON P. Preserving herbarium specimens in natural colors. *Herbertia* 7: 62. 1940.—Flowers were cut after the morning dew had dried. Containers were new porous clay pots. Flowers were placed in these, held in position with one hand, and fine dry sand was poured around them with the other. Flowers removed several months later were excellently preserved in shape and color, and were in as good shape 6 months afterwards as at time of removal from sand. Material of *Amaryllis belladonna* was used in this work. Dissected flowers of Amaryllids are well preserved by the same method.—W. S. Flory, Jr.

ETHNOBIOLOGY

(See also Entries Cotton, 11594; The pigeon, 12703; Shells from kitchen-middens, Celebes, 13702)

11511. DAHLGREN, B. E. The story of food plants. *Field Mus. Nat. Hist. Bot. Leaflet* 25. 1-32. Frontispiece, 2 maps, 15 fig. 1940.

11512. EDWARDS, EVERETT E., and WAYNE D. RASMUSSEN. A bibliography on the agriculture of the American Indians. *U. S. Dept. Agric. Misc. Publ.* 447. 1-107. 1942.—The scope of this selected bibliography is as follows: The comprehensive references on the pre-Columbian agri-

culture of the Americas are of special interest to the general reader. The section on the centers of advanced agricultural development supplies references for the research worker who wishes to study Indian farming methods. The section on the particular crops domesticated and raised by the Indians is helpful to the scientist in research incident to the history and improvement of these crops. That on the agriculture of the reservations in the U. S. provides selected references on recent and present-day problems of conservation, forestry, irrigation, and land use. Those on food and medicinal plants are similarly useful to the scientist who seeks new sources of food and drugs. In view of the fact that Indians constitute a large share of the populations of many of the Latin-American countries, the bibliography is also a contribution to a better understanding of their culture and thus to closer relations between the Americas.—E. E. Edwards.

11513. WARWICK, B. L., and R. O. BERRY. The origin and early history of sheep. *Sheep and Goat Raiser* 22(3): 33. 1941.

TEXTS AND EDUCATION

11514. GIVLER, J. P. (*U. North Carolina*) How readest thou? *Bios* 10(3): 143-150. 1939.—A discussion of the reading habits of College and University students, with particular reference to Biology. The rôle of study of the scientific literature (along with experimentation and observation) as an essential activity of scientists is stressed.

MISCELLANEOUS

11515. BRAND, CHARLES J. (*Nation. Fert. Assoc., Washington, D. C.*) Agriculture after the war. *Amer. Fertilizer* 94(13): 9-11, 20, 22, 24. 1941.

11516. CÁRDENAS, MARTÍN. (*U. Autonoma Cochabamba, Bolivia*) Recursos naturales del reino vegetal en Bolivia. *Chron. Bot.* 6(17/18): 404-406. 1941.—Bolivia has few exports other than raw materials, mostly mineral. Formerly she had much quinine and rubber but these are now of slight importance due to the large scale production in Asia. Some present day problems undertaken by the University are genetics and phytopathology of potatoes and maize. Describes the production and cultivation of some of the more important crops, and especially projects in forestry.—L. J. Gier.

11517. PARODI, LORENZO R. (*U. Buenos Aires*) La agricultura en la República Argentina. *Chron. Bot.* 7(1): 19-23. 1942.—Brief description of the 5 geographical regions followed by discussions of cereals, vegetables, fruits, forage, etc. 15 references in bibliog.—L. J. Gier.

11518. POPENOE, WILSON. (*United Fruit Co., Guatemala City*) Plant resources of Guatemala. *Chron. Bot.* 7(1): 16-19. 1942.—Discusses each of the 5 natural zones with their particular resources. Points out fields of great need (reforestation, forest pathology, erosion control, etc.) and states that Guatemala is not a one-crop nation as some of the others are.—L. J. Gier.

BIOGRAPHY AND HISTORY

CARROLL W. DODGE, *Editor*

(See also Entries 12679, 12847, 13173, 13370, 13557)

HISTORY

11519. ASMOUS, V. C. Jubilee of the Society of Naturalists of Moscow. *Chron. Bot.* 6(17/18): 422-423. 1941.—Celebrated their 135th anniversary in 1940. The article gives a history of the organization.—L. J. Gier.

11520. BAILEY, C. H. (*U. Minnesota*) A translation of Beccari's lecture "Concerning grain" (1728). *Cereal Chem.* 18(5): 555-561. 1941.—Translated from medieval Latin by F. LOENHOLDT and revised by C. H. Bailey, this classical paper describes the first recorded observation concerning gluten in wheat flour.—R. K. Larmour.

11521. HARDING, T. SWANN. (*U. S. Dept. Agric.*) The rise of the United States Department of Agriculture. *Sci. Month.* 53(6): 554-564. 1941.—An historical sketch of the development of the U. S. Dept. of Agric.—F. R. Hunter.

11522. JELLINEK, E. MORTON. Classics of the alcohol literature. An early medical view of alcohol addiction and its treatment. Dr. Thomas Trotter's "Essay, medical, philo-

sophical and chemical, on drunkenness." *Quart. Jour. Stud. Alcohol.* 2(3): 584-591. 1941.

11523. MORGAN, WILLIAM GERRY. The American College of Physicians; its first quarter century: A history. 276p. American College of Physicians: Philadelphia, 1940. Pr. \$2.

11524. TURRILL, W. B. (*Kew Garden*) The centenary of the Royal Botanic Gardens, Kew, April 1, 1941. *Chron. Bot.* 6(17/18): 414-417. 1941.—A history of the Gardens, and an account of the discoveries, past and, present members of the staff, directors, and other prominent botanists who did some of their work at the Gardens. Principal contributions of each of the workers are listed.—L. J. Gier.

BIOGRAPHY

11525. ARBER, AGNES. (*Cambridge, Eng.*) The relation of Nehemiah Grew and Marcello Malpighi. *Chron. Bot.* 6(17/18): 391-392. 1941.—Defends Grew against statements

of Schleiden (that Grew had taken unfair advantage of Malpighi's works) and concludes "the actual work of the two men . . . shows little signs of reciprocal influence."—*L. J. Gier.*

11526. ASMOUS, V. C. (*Arnold Arboretum.*) P. S. Pallas as a botanist and explorer (1741-1811). *Chron. Bot.* 7(1): 14. 1942.—A German who devoted most of his life to services of Russian govt. Published more than 170 works on botany, zoology, geology, etc. 5 biographies of him are listed.—*L. J. Gier.*

11527. BECK, WILLIAM A. (*U. Dayton.*) ALFRED URSPRUNG. *Plant. Physiol.* 17(1): 1-6. 1 pl. 1942.—Alfred Ursprung, head of the Department of Botany, Fribourg (Switzerland), will celebrate his 66th birthday on Dec. 22, having been born in 1876. He received his B.Sc. (1895) and Ph.D. (1900 *summa cum laude*) from Univ. Basel. After further research work there he worked with Schwenninger at Berlin. He assisted Westermaier at Fribourg in 1902, became ordinary Prof. there in 1907. He published 86 works and 35 dissertations. These are in five domains: Formation of annual rings; eccentric growth; the mechanics of sporangia and anthers; radiation and photosynthesis; ascent of sap and the osmotic quantities in plants. He is best known for his system of terms of osmotic quantities and the quantitative determinations of these and the influence of external factors on the same. A summary of the exposition of the water economy of plants is given by him in "Handwörterbuch der Naturwissenschaften" (1934). The methods employed are described in "Handbuch der biologischen Arbeitsmethoden" (1937). He formulated the law: "The suction force of a cell is given by the suction tension of the contents of the cell less the wall pressure." He is still actively engaged in research.—*W. A. Beck.*

11528. CLAPESATTLE, HELEN B. *The Doctors Mayo.* xiv + 812p. Map, illus. University of Minnesota Press: Minneapolis, 1941. Pr. \$3.75.—This is not only a triple biography of Doctor William W. Mayo ("the old Doctor") and his two famous sons, Doctors William J. ("Doctor Will") and Charles H. ("Doctor Charlie"), but is, moreover, an inspiring history told in leisurely fashion and packed with absorbing details of almost a century of medical and surgical practice, teaching, research and progress, of pioneer days on the American frontier and of the growth of Rochester, Minn., as a famous clinical center. The story of Dr. W. W. Mayo's adventuresome career begins with his schooling in Manchester, England under John Dalton and includes his immigration to America where he first became pharmacist at Bellevue Hospital; his migration westward to Indiana, where he tailored, obtained a medical degree at the Indiana Med. College, doctored, mixed drugs, and married; his leisurely wanderings through Illinois and his eventual settlement in Minn., where he dabbled in politics and farming, practiced medicine and eventually became the leading physician. He gained considerable local renown as a pioneer in gynecology, especially ovariotomy. His early exploits in "kitchen surgery" make fascinating reading. The biographies of Will and Charles Mayo portray their boyhood experiences assisting their father in bandaging wounds, administering anesthetic and in operations; their medical schooling (Will at the Univ. of Michigan, where Franklin Paine Mall was one of his classmates, and Charles at the Chicago Med. College which later affiliated with Northwestern U.); how they gradually built up their practice and specialized in surgery, attended postgraduate courses and important clinics here and abroad; how the tornado of 1883 furnished the impetus for the founding of St. Mary's Hospital and the astounding growth of the latter; the evolution of the Mayo clinic, the establishment of the Mayo Foundation and its affiliation with the Univ. of Minnesota. The human side of the Mayos is emphasized especially their congeniality, philanthropy and civic spirit and interesting side lights concerning their multitude of associates are given. Aside from the biographical treatment the book de-

picts in dramatic fashion the story of the development of modern surgery and clinical medicine.—*L. F. Edwards.*

11529. COCKERELL, T. D. A. (*U. Colorado.*) The epic of yellow fever. *Sci. Month.* 54(1): 43-48. 6 fig. 1942.—A brief historical sketch of some of the men involved in studying yellow fever.—*F. R. Hunter.*

11530. DOBELL, CLIFFORD. (*Nat. Inst. Med. Res., London.*) Vilém Lambi (1824-1895). A portrait and a biographical note. *Parasitology* 32(1): 122-125. Portrait. 1940.

11531. DOBELL, CLIFFORD. (*Nat. Inst. Med. Res., London.*) Michał Siedlecki (1873-1940). A founder of modern knowledge of the Sporozoa. *Parasitology* 33(1): 1-7. Portrait. 1941.

11532. DOBELL, CLIFFORD. (*Nat. Inst. Med. Res., London.*) Dr. O. Uplavici (1887-1938). *Parasitology* 30(2): 239-241. 1938.

11533. HARVEY, R. B. Rodney Howard True. *Chron. Bot.* 6(17/18): 424-425. 1941.—Oct. 14, 1866-April 8, 1940.—Plant physiologist and pharmacologist.—*L. J. Gier.*

11534. JUST, THEO. Obituary of Heinrich Freiherr von Handel-Mazzetti. *Chron. Bot.* 7(2): 88-89. 1942.—Feb. 19, 1882-Feb. 1, 1940. Authority on flora of China, monographed genus *Taraxicum*, and wrote a travelogue on his experiences in China, besides the influence he exerted upon the other workers with whom he came in contact.—*L. J. Gier.*

11535. KEMPTON, J. H., G. N. COLLINS [1872-1938]. *Chron. Bot.* 6(17/18): 426. 1941.—Collector of new materials, particularly economic plants and, for the last 30 yrs., a student of genetics of maize.—*L. J. Gier.*

11536. MEYER, KARL ALFONS. Dr. h. c. Philipp Flury. *Schweiz. Zeitschr. Forstw.* 92(10): 233-241. Portrait. 1941.—Flury (1861-1941) was one of the best-known Swiss foresters, Deputy Director of the Swiss Forest Research Institute at Zürich and author of the international classification for forestry literature.—*W. N. Sparhawk.*

11537. RICHARDS, P. W. Obituary of Sir Albert Charles Seward [1863-1941]. *Chron. Bot.* 7(1): 40-41. 1942.—Paleobotanist and Prof. of Botany at Cambridge, authority on Mesozoic plants.—*L. J. Gier.*

11538. ROGERS, DONALD P. Obituary of Eduard Fischer [1861-1939]. *Chron. Bot.* 7(2): 87-88. 1942.—Distinguished mycologist and phytopathologist.—*L. J. Gier.*

11539. RUSSELL, E. J. Obituary of Vasili Robertovich Williams. *Chron. Bot.* 7(2): 89-90. 1942.—Russian soil scientist, particularly interested in control of erosion and in soil building plants.—*L. J. Gier.*

11540. ST. JOHN, HAROLD. (*U. Hawaii, Honolulu.*) Later travels and botanical studies of William Hillebrand. *Chron. Bot.* 7(2): 69-70. 1942.—Brief note on portion of life of "the outstanding botanist of the Hawaiian Islands," particularly relative to his associations with Dr. Asa Gray.—*L. J. Gier.*

11541. SCHAEPPPI, H. (*Winterthur, Zürich.*) Robert Keller [1854-1939]. *Chron. Bot.* 6(17/18): 425-426. 1941.—Swiss botanist, best known for work in plant geography, anatomy, and physiology, but especially in taxonomy of *Rosa*, *Rubra*, and *Hypericum*.—*L. J. Gier.*

11542. SEABROOK, WILLIAM. Doctor Wood. Modern wizard of the laboratory. xiv + 335p. Frontispiece, 14 fig. Harcourt, Brace and Co.: New York, 1941. Pr. \$3.75.—Dr. Robert W. Wood is a physicist noted for his investigations in physical optics and for his whimsical incursion into unnatural history in his *How to tell the birds from the flowers*. He has cleverly exposed frauds and self deceptions such as Blondlot's N-rays. His contributions to biology include papers on fish vision under water, theory of the greenhouse, high-frequency sound waves and electric fever, and fluorescence of chlorophyll in relation to photochemical processes in plants. This is a very readable biography. A list of 263 scientific works is appended.—*C. A. Kofoid.*

11543. OBITUARY. George Henry Falkiner Nuttal, 1862-1937. *Parasitology* 30(4): 403-418. Portrait. 1938.—British parasitologist.

BIBLIOGRAPHY

EILEEN R. CUNNINGHAM, *Editor*

(See also B. A. 16(4): Entries 10254, 10451, 10543)

11544. BOLETIN del INSTITUTO BOTANICO. (*Quito, Ecuador.*) Volume 1, Number 1, January 1942. Director: ALFREDO PAREDES C. 255 pages, 10 articles. Published by the Universidad Central del Ecuador.—The following papers comprise this issue: Una excursión botánica, by ALFREDO PARECIES C; Quinua, by CARLOS GONSENBACH; La Alternariosis de la patata, by L. RODRIGUEZ Lz; Eucalyptus, by ALONSO CASTILLO V; La anguilulosis de la patata, by L. RODRIGUEZ Lz; Notas sobre la resina fósil, by JOSÉ E. MUÑOZ; Biogénesis natural, by PLUTARCO NARANJO V; Generación espontánea o creación? by ED. LUNA YÉPEZ; Sensibilidad en las plantas, by ERNESTO PÉREZ; and El significado de la flor, by HUGO QUIROZ.

11545. BURHOE, RALPH W. (*Blue Hill Observatory.*) Bibliographic tools for meteorological research. *Bull. Amer. Meteorol. Soc.* 22(9): 357-361. 1941.—The function and the value of a classified bibliography of meteorological literature are discussed. The adequacies and the inadequacies of the existing English, French, and German bibliographies are pointed out. It is proposed that an adequate bibliographic

service for meteorology be started in America.—Frederick Sargent.

11546. ERICKSON, ARNOLD B. Editions of Wilson's "American Ornithology." *Flicker* 12: 41-46. 1940.

11547. GLADSTONE, HUGH. Christopher Merrett and his *Pinax Rerum Naturalium Britannicarum*. *British Birds* 35: 73-80. 1941.—With an account of this rare book.—Courtesy Auk.

11548. MILLER, ETHEL MELSHEIMER. Dates of receipt of the Annals in university libraries. *Ann. Ent. Soc. America* 34(3): 689. 1941.

11549. RUYSEN, Y. La bibliothèque. *Bull. Mus. Hist. Nat. Marseille* 1(1): 84-91. 1941.—A general historical account is given of the library of the Mus. of Nat. Hist. at Marseille.—W. C. Tobie.

11550. STEARN, W. T. Bibliographical notes. CXIV. Durieu and Cosson's "Exploration Scientifique de l'Algérie" and Dunal's "Petit Bouquet Méditerranéen." *Jour. Bot.* 79 (943): 116-117. 1941.—Notes on dates of issue.—E. D. Merrill.

EVOLUTION

ALFRED EMERSON, *Editor*

(See also Entries Spontaneous chromosome change in plants, 11558; Speciation in Capparidaceae, 11564, in smuts, 13455, in Australian parrots, 3964; Species hybridization in fish, 11620; Species differences in nutrition, fungi, 13457; Probability of fixation of reciprocal translocation, 11634; Planktonic organism, 11725; Evolution of fleece in sheep, 12682; Acquired enzymic properties of intestinal bacteria, 12711; Expt. alteration of ciliates, 13609; Shore birds and gulls in Miocene, 14021; Bodily adaptation to saltatory habit, Wallaroo, 14076; Rodent, Columbia River as barrier, 14086)

11551. AXELROD, DANIEL I. (*U. California, Berkeley.*) The concept of Ecospecies in Tertiary paleobotany. *Proc. Nation. Acad. Sci. U. S. A.* 27(12): 545-551. 1941.—The Tertiary distribution of the fossil equivalents of modern endemic trees and shrubs brought them into contact with diverse types of climate, habitat and vegetation. Available evidence suggests that when fossil species related to these endemics are recorded in habitats which are widely different from those now occupied by their nearest descendants, we may be dealing with ecotypes having no close counterparts in the modern flora. Late Cenozoic elimination of biotypes apparently has left the modern endemics surviving in habitats which may be considerably different from those occupied by certain of their fossil relatives; a similar interpretation may be applied also to certain other trees and shrubs. Since paleoecological interpretations are based on plant communities, and not solely on individual species, the recognition of ecotypes in the fossil record has no effect on the general procedure for reconstruction of past environments. On the contrary, their recognition makes it possible to explain certain inconsistencies of association which otherwise defy interpretation.—R. A. Muttikowski.

11552. FORBES, GRACE SPRINGER, and HENRY E. CRAMPTON. (*Columbia U.*) The differentiation of geographical groups in *Lymnaea palustris*. *Biol. Bull.* 82(1):

26-46. 1942.—Sample populations of *L. palustris* from 2 localities and habitats were analyzed by methods employed in the analysis of variance for significant differences in fertility, growth, and longevity. Definite differences in all these 3 physiol. characteristics were found. The study of these group differences was continued throughout 3 consecutive generations, in each of which the differences were maintained. The 2 local populations are therefore regarded as different geographical races. Extreme types of slow-growing and fast-growing individuals were found in each group with intermediates of great variety. The critical period in the growth curve occurs early in the life-cycle when the individual mode of growth appears to be established. In both geographical groups, onset of fertility was negatively correlated with size at 80 days despite demonstrated group differences in size at 80 days, and in age at onset. The sterile snails in each population were collectively smaller and shorter-lived than the productive individuals.—G. S. Forbes.

11553. MOORE, JOHN A. (*Queens Coll.*) Isolating mechanisms in the genus *Rana*. *Anat. Rec.* 81(4): suppl. 71. 1941.—An abstract.

11554. SCOTT, JOHN W. (*U. Wyoming.*) Sexual selection in the sage grouse. *Anat. Rec.* 81(4): suppl. 51. 1941.—An abstract.

CYTOLOGY

Editors: R. E. CLELAND, *Plant*; C. E. McCLUNG, *Animal*

(See also Entries 11594, 11596, 11597, 11599, 11602, 11603, 11607, 11609, 11611, 11612, 12423, 12607, 12646, 12659, 12660, 12676, 13046, 13143, 13602, 13608, 13934)

PLANT

11555. AISIMA, T. (*Kyoto Imp. U.*) Studies of mitosis and meiosis in comparison II. Chromosome structure in the spiral stage and anaphase in mitosis as revealed by means of a maceration method. *Cytologia* 11(3): 429-435. 1941.—By treating with acid, the chromosomes were macerated and studied. The anaphase chromosome proved to be com-

posed of 2 chromatids each of which contained a chromosome spiral or spirals. During telophase and interphase the coiled state remained. At prophase the chromonemata seemed to approach, and were transformed into regularly coiled major spirals in which the new or minor coiling progressed. The prophasic changes, such as the straightening out of the old spirals, and the thickening and shortening

of the chromosome then ensued. Gradually each chromosome developed a visible-longitudinal split.—*Taylor Hinton.*
11556. BALDWIN, J. T. Jr. (U. Michigan.) Cytogeography of *Oxydendrum arboreum*. *Bull. Torrey Bot. Club* 69 (2): 134-136. Map. 1942.—At mitotic metaphase in leaves of *O. arboreum* the 2n-number of chromosomes is 24; at meiotic metaphase in anthers the n-number is 12. Specimens growing at 31 stations distributed throughout the distributional area of the species were examined cytologically.—*J. T. Baldwin, Jr.*

11557. DARLINGTON, C. D., and P. T. THOMAS. (John Innes Hort. Inst., Merton, England.) Morbid mitosis and the activity of inert chromosomes in *Sorghum*. *Proc. Roy. Soc. Ser. B: Biol. Sci.* 130(859): 127-150. 26 fig. 1941.—*Sorghum purpureo-sericeum* has 5 pairs of active, A, chromosomes and a variable number of extra, B, chromosomes in equilibrium in the wild population (Janaki-Ammal 1940; and table 7). The B-chromosomes vary in structure within and between plants owing to frequent spontaneous changes, including misdivision of the centromere. One is an iso-chromosome. The B's are sex-limited so far as that is possible in a plant: they are confined to the germ track owing to loss by lagging elsewhere. They are lost in the radicle before seed ripening and in the shoot tissues as they reach maturity. Only in the anthers and ovaries are they regularly maintained. B-chromosomes pair with one another at meiosis when homologous, and the 2 arms of the iso-chromosome form chiasmata with one another. Pollen grains of plus plants (with extra B's) have extra divisions of the vegetative nucleus rapidly following the primary division. The first pollen-grain division is delayed by the presence of B-chromosomes. Its course is always normal. At the 2d division the B's always pass to the generative pole undivided and so the dose is doubled. When only 2 generative nuclei are formed, one or both may produce sperm. Three, 4 or 5 generative nuclei, however, kill the pollen grain. The extra divisions are thus malignant. The B-chromosomes as usual are heterochromatic. They have an abnormal nucleic acid cycle. Their action on the cells containing them is non-specific and cumulative, and their apparently specific effect in stimulating mitosis in the pollen grains is possibly due to these being the only cells that contain them whose mitosis and growth are normally limited. Spontaneous structural changes in heterochromatic chromosomes are frequent at mitosis in plants and animals. Such changes could evidently establish malignant propensities in somatic cells by stimulating recurrent mitosis.—*Auth. abst.*

11558. DARLINGTON, C. D., and M. B. UPCOTT. (John Innes Hort. Inst., Merton, Eng.) Spontaneous chromosome change. *Jour. Genetics* 41(2/3): 297-338. 1 pl., 23 fig. 1941.—In pollen grains and tubes of *Tulipa*, *Hyacinthus*, and *Tradescantia* spontaneous chromosome changes are of 4 kinds: (1) externally induced nuclear breakage and reunion, (2) nuclear sister reunion of broken or unbroken chromatids, (3) metaphase breakage at centromeres, (4) anaphase breakage of chromatids. Each is characteristic of particular genotypes, hybrids, or mutants.—A clone of *Tulipa fragrans* having a threshold for breakage within the normal environmental range gives type 1 changes. Chromosome breaks may be followed by chromosome, sister chromatid, or non-sister chromatid reunions, in order of succession, or by no reunions at all. The observed frequencies differ from those of induced breakage only in having an internal threshold and cell uniformity. The latter is believed to depend upon the synchronization of breakages and upon an increasing frequency of breakage as the moment of chromosome splitting approaches and the possibility of sister reunion is enhanced. There is a high frequency of small acentrics not showing sister reunion and therefore regarded as minute rings. This is held to indicate that non-sister reunion, competing with restitution, occurs with greater ease when there are double breaks close together. Such aberrants should not be considered evidence for double breaks from single hits. The similarity of natural and induced changes confirms the view that the observed diversity in the results of induced breakage is due to diversity in the conditions of reunion. Metaphase structures are then evidence of the state of the chromosome at the time of reunion, and not at the time of breakage.

From this it may be deduced that all chromosomes behave as though they split uniformly late in the intermitotic resting stage.—The hypothesis of competition between restitution and delayed reunion, along with variability in the conditions of reunion, and especially of sister reunion, makes it possible to account for the exponential dosage-frequency relation, for intensity and fractionation effects, and for the excess of small fragments following x-ray induced chromosome breakage, without recourse to views that the time at which the chromosomes split is variable or that sister chromatids can be broken at sister points by a single hit.—*H. B. Glass.*

11559. HOLLINGSHEAD, LILLIAN. (Cornell U., Ithaca.) Chromosome studies in *Sedum*, subgenus *Gormania*, section *Eugormania*. *Bull. Torrey Bot. Club* 69(1): 41-43. 1942.—Root tips of *S. obtusatum*, *S. glanduliferum* and *S. laxum* have 30 small roundish chromosomes, and those of *S. oregonense* 90 such chromosomes. The 2-armed structure typical of mitotic chromosomes and found heretofore in *Sedum* was not evident. Clausen includes these spp. in the subgenus *Gormania*, section *Eugormania*. The results support Baldwin's conclusion that chromosome size in Crassulaceae within a restricted group is fairly uniform.—*Lillian Hollingshead.*

11560. ILLICK, J. THERON. (Syracuse U.) Chromosomes of *Ginkgo biloba* during early developmental stages of the male gametophyte. *Anat. Rec.* 81(4): suppl. 78-79. 1941.—An abstract.

11561. MARQUANDT, H. Die Röntgenpathologie der Mitose. III. Weitere Untersuchungen des Sekundärefekts der Röntgenstrahlen auf die haploide Mitose von *Bellevallia romana*. *Zeitschr. Bot.* 36(6/8): 273-386. 1941.

11562. MATSUURA, HAJIME. (Hokkaido U., Sapporo.) Chromosome studies on *Trillium kamtschaticum* Pall. XIII. The structure and behavior of the kinetochore. XIV. Primary and secondary chiasmata. XV. A contribution to the present status of knowledge on the mechanism of chromosome coiling. *Cytologia* 11(3): 369-387, 407-428. 1941.—XIII. The author prefers the term "kinetochore" to "centromere" because it has proved not to be of such a chromomeric nature as the latter name implies. The kinetochore is a compound body consisting of the chromonematic thread (kinetonema), which is persistent throughout the division, and of the matrix surrounding it, which develops fully at metaphase. The rest of the chromonema (genonema) seems to be precocious in behavior but otherwise similar to the behavior of the kinetonema in pairing, opening-out, separation, and in the development of the matrix. The "Zugfasern" are presumed to develop from the kinetochore toward the pole and not in the reverse direction.—XIV. Two types of chiasma are described with respect to their mode of origin: "primary chiasmata" which are related directly to the development of interstitial repulsion; and "secondary chiasmata" which are controlled by the relation of the strength of the repulsion forces to the surface tension and the viscous resistance set up by the matrix substance. When the repulsion forces overcome the matrical resistance, it is considered that the chromatids will open out to the final point—the kinetochore.—XV. Coiling in chiasma loops and chromatid bridges was studied to ascertain how, when both ends are fixed, the process differs from the cases where the distal ends are free. When they are below a certain limit of length, they are unable to assume regular cylindrical spirals but take wavy corrugated configurations. Sometimes each of the paired chromatids is subjected to independent coiling. When they are long, the configuration is characterized by an increase in frequency of reversals in coiling direction. The spiral of the "balanced type" (coils in one direction being compensated by coils in the opposite direction and the thread being free from twisting) occurs predominantly. The author infers that: pairing of the homologues takes place after the leptotene threads have completed the untwisting of the relic twists; the 4 strands lie essentially parallel; "fixed" strands are unable to rotate in spirallisation to be converted into the relational spiral and therefore take more complicated configurations; and the factors responsible for the formation of the major and minor spiral are, (a) the space delimited by the matrix, (b) the elasticity of the chromonema, and (c) the electrical charges to be

accepted by the chromonema at the metaphase plate which determine at the same time the external chromosome mechanics.—*Taylor Hinton*.

11563. MYERS, W. M. (Pennsylvania State Coll.) Variations in chromosomal behavior during meiosis among plants of *Lolium perenne* L. *Cytologia* 11(3): 388-406. 1941.—Significant negative correlation coefficients were obtained between total chiasma frequency and % of metaphase I sporocytes having univalents; and between both total and terminal chiasma frequency and percentage of sporocytes having loosely attached bivalents. Apparently lagging and dividing univalents at anaphase I were important in producing micronuclei in the quartets both as a result of failure of the daughter half chromosomes to reach the poles in the first division and their inability to move normally in the 2d division, although the data indicated some source in addition to lagging univalents. Of the 19 plants studied, 13 were heterozygous for inversions. Occasional irregularities in premeiotic divisions were suggested by aneuploid and a tetraploid sporocyte. Apparently factors in addition to the meiotic irregularities studied were conditioning pollen abortion in the plants.—*Taylor Hinton*.

11564. RAGHAVAN, T. S., and K. R. VENKATASUBBAN. (Annamalai U.) Studies in the Capparidaceae. VIII. The cytology of *Capparis zeylanica* Linn. and related genera. *Cytologia* 11(3): 319-331. 1941.—The haploid chromosome numbers of the following were determined: *Capparis zeylanica*, 20; *Cadaba indica*, 18; *Maerua arenaria*, 10. Polyploidy and structural changes of chromosomes have played an important part in the evolution of the species. An original suggestion that 7 is the primary basic number of the family is supported here. Secondary association is reported for *Capparis zeylanica*. Structural changes of the chromosomes make unreliable the use of secondary pairing alone to determine ancestral homology and basic numbers. A tentative scheme is formulated to show the phylogeny of some of the genera.—*Taylor Hinton*.

11565. RICHHARIA, R. H., and J. P. KOTWAL. Chromosome number in Bamboo (*Dendrocalamus strictus*). *Indian Jour. Agric. Sci.* 10(6): 1033. 1940.—In the root-tip cells, $2n=72$.—*C. H. Arndt*.

11566. SINOTO, Y., and A. YUASA. (Tokyo U.) Karyological studies in *Saccharomyces cerevisiae*. *Cytologia* 11(3): 464-472. 1941.—The nucleus of the vegetative cells of this yeast is composed of a central deeply stained karyosome with a hyaline zone around it, and an external membrane. The karyosome is spherical or irregular. With takadiastase it shows a granular structure. The nucleus and some granules are stained by the Feulgen reaction. The nucleus undergoes mitosis, showing 4 chromosomes, and produces 2 daughter nuclei one of which travels through the isthmus into the bud, while the other remains as the nucleus of the mother cell.—*Taylor Hinton*.

11567. URAGUCHI, MASA. (U. Pennsylvania.) Rhythmic banding in protoplasm. *Cytologia* 11(3): 332-337. 1941.—Various salts and acids cause the formation of rhythmic bands through the precipitation of proteins in the protoplasm of slime molds. Both the H-ion and the ions of heavy metals produce banded precipitates, resembling the Liesegang phenomenon. The more rapid entrance of solutes at certain points of the plasmodium indicated differentiation in the permeability of the surface.—*Taylor Hinton*.

11568. WADA, BUNGO. (Tokyo Imp. U.) Über die Spindelfigur bei der somatischen Mitose der Prothalliumzellen von *Osmunda japonica* Thunb. in vivo. *Cytologia* 11(3): 353-368. 1941.—From observations on living prothallium cells, the nature of the achromatic figure in mitosis was studied. It was concluded that the disappearance of the nuclear wall at the end of prophase does not occur at the time of the formation of the metaphase spindle. The attractoplasm arises from the karyolymph as the ground substance of the achromatic figure and acts as an independent body in shape and function, separating itself from the cytoplasm. The beginning of the separating wall of the dividing cell develops in the phragmoplast centrifugally. The permanent partition develops centripetally. After the formation of the cell plate the phragmoplast degenerates, the part which did not participate in the

formation of the separating wall becoming cytoplasm.—*Taylor Hinton*.

ANIMAL

11569. BEAMS, H. W., and JOHN F. SHEEHAN. (U. Iowa.) Yolk-nucleus complex of the human ovum. *Anat. Rec.* 81(4): suppl. 35-36. 1941.—An abstract.

11570. BULLOUGH, W. S., and HELENA F. GIBBS. (U. Leeds.) Oogenesis in adult mice and starlings. *Nature [London]* 148(3754): 439-440. 1941.—In this strain of mice oestrus lasts about 48 hrs. and ovulation occurs during the last 12 hours. A peak is reached in the mitotic index of oogonia formation from germinal epithelium immediately following ovulation. In the starling the production of new oogonia from germinal epithelium follows a cycle of mitotic activity similar to that of the mouse, reaching its peak in May for both 1- and 2-yr-old ♀♀. A 2d lower peak is reached in June in 2-yr. birds which lay 2 clutches each year. Thus in both mouse and starling production of new oogonia from germinal epithelium in adults reaches a sharp peak during the post-ovulation period.—*E. D. Crabb*.

11571. CHURNEY, LEON. (U. Pennsylvania.) The osmotic properties of the nucleus. *Biol. Bull.* 82(1): 52-67. 1942.—The nucleus (germinal vesicle) of the immature *Arbacia* egg closely approximates an osmometer in its behavior. The nuclear membrane gives clear evidence of being almost perfectly semi-permeable and only deviates from the Boyle-van't Hoff law at the greater dilutions. Data are presented on the osmotic properties of the nucleolus and cell as a whole. There is some evidence that in the process of growth both cells and nuclei tend to become less perfect in their osmotic behavior. The germinal vesicle of the mature, unfertilized egg of *Nereis limbata* also behaves as an osmometer, though not as perfectly as that of the *Arbacia* egg. It seems significant that these expts. fail to reveal any appreciable amt. of osmotically inactive material in either of the nuclei. In this respect, however, it appears highly desirable that new and independent methods of exptl. attack be devised for the study of the problem of the "non-solvent volume." Some attention has been paid, in the case of the germinal vesicle of the *Nereis* egg, to the analysis of the phenomenon of leakage and an exptl. method was devised for studying this factor. For dilutions of sea water not greater than 60% the volumes attained by the nuclei at equilibrium are independent of the path traversed; in 50% sea water, there is some evidence that this rule does not apply. The implication of these results is discussed with reference to the occurrence of leakage in hypotonic solutions.—*Leon Churney*.

11572. COPELAND, D. EUGENE. (U. North Carolina.) The cytology of the pituitary gland in *Triturus viridescens*. *Anat. Rec.* 81(4): suppl. 36. 1941.—An abstract.

11573. DEANE, HELEN WENDLER. (Brown U.) A cytological study of the fatty liver produced by a high-sugar diet. *Anat. Rec.* 81(4): suppl. 79. 1941.—An abstract.

11574. FANKHAUSER, GERHARD, RITA CROTTA, and MAX PERROT. (Princeton U.) Spontaneous and cold-induced triploidy in the Japanese newt, *Triturus pyrrhogaster*. *Jour. Exp. Zool.* 89(1): 167-180. 1 pl. 1942.—117 eggs of *T. pyrrhogaster* were refrigerated, immediately after laying, at $+1.5^{\circ}$ to 2.5°C , for from 5 to > 24 hrs. Of the 29 larvae which were obtained from refrigerated eggs, 13 were triploid (36 chromosomes), 11 diploid (24 chromosomes), 4 haploid (12 chromosomes), and 1 hyper-diploid (27 or 28 chromosomes). The chromosome numbers were detd. in whole-mounts of tailtips amputated in an early larval stage. Of 273 control larvae raised from untreated eggs, 3 were found to be spontaneous triploids. The frequency of spontaneous or "natural" triploidy, 1.1%, is similar to that found in *T. viridescens*. In the epidermis of the tailfin of 2 diploid control larvae, an approx. tetraploid metaphase was found, associated with a few large interkinetic nuclei. Somatic doubling thus may occur and produce small areas of tetraploid cells in diploid larvae. The appearance of the triploid larvae was normal aside from the pigment pattern. Triploid larvae have larger but fewer melanophores and can usually be recognized before tail-clipping. 5 triploid larvae which were fed *Enchytraeus* 3 times a week ("normal" feeding schedule) did not show any signs of gigantism; 2 larvae raised on a *Daphnia* diet

with "maximal feeding" grew slightly larger than controls on the same diet.—Auth. (courtesy *Wistar Bibl. Serv.*).

11575. KOLLER, P. C., and C. A. AUERBACH. (U. Edinburgh.) Chromosome breakage and sterility in the mouse. *Nature [London]* 148(3756): 501-502. 1941.—Hereditary partial sterility was produced in 3 strains of mice by x-irradiation. Spermatogenesis of interchange hybrids showed 4 chromosomes associated as a chain in 2 lines and as a ring in the 3d line during meiosis. Cytological and genetical studies indicate that in 2 of the lines a long and a short segment of 2 non-homologous chromosomes interchange and that the breakage points are distant from the centromere; in the 3d line the high incidence of sterility is due to an interchange involving larger segments with breakage points adjacent to the centromere.—E. D. Crabb.

11576. LISCO, HERMANN. (Johns Hopkins Med. Sch.) Russell bodies occurring in the lymph follicles of the intestinal tract of pigs. *Anat. Rec.* 82(1): 59-66. 2 fig. 1942.—Intracellular cytoplasmic inclusions occurring in lymph follicles of the intestinal tract of pigs and resembling Russell bodies are described and their formation and distribution discussed. They seem to occur in lymphoid cells as well as in plasma cells. The appearance of these Russell bodies cannot be correlated with the inflammatory reaction invariably present in the intestines of pigs.—Auth. (courtesy *Wistar Bibl. Serv.*).

11577. MICKEY, GEORGE H., and R. M. MELAMPY. (Louisiana State U.) Cytological studies on fat cells in the larval honeybee (*Apis mellifera* L.). *Anat. Rec.* 81(4): suppl. 53. 1941.—An abstract.

11578. MOORE, BETTY C. (Columbia U.) Androgenetic frog hybrids. *Anat. Rec.* 81(4): suppl. 83-84. 1941.—An abstract.

11579. NOZAWA, K. (Kyoto Imp. U.) Ecto-endoplasmic ratio as a physiological factor for the determination of the cell volume of *Actinosphaerium eichhorni* (Ehrenberg). *Jap. Jour. Zool.* 9(1): 1-18. 11 fig. 1940.—The ratio was larger in small individuals, and smaller in large ones. It was between 1 and 4 in normal individuals and the maximum cell size was reached when the ratio approached 1. The formula for the ecto-endoplasmic ratio was

$$R = (bc/bn)L^{(a_e-a_n)}$$

where L was the cell diameter, bc and a_e were constants relative to the ectoplasm and bn and a_n were constants relative to the endoplasm, determined by measuring the diam. of entire cell and that of the endoplasm.—Ivan Pratt.

11580. NOZAWA, K. (Kyoto Imp. U.) 6. Studies on the quantitative relation between the nuclei and the cytoplasm in *Actinosphaerium eichhorni*. I. *Jap. Jour. Zool.* 9(1): 139-152. 7 fig. 1940.—The nucleo-plasmic ratio was expressed by

the formula $1.316 L^{-1}$ where L was the dimensionless value of the cell diam. The surface-voluminal and ecto-endoplasmic ratios were $6.0 L^{-1}$ and $5.056 L^{-1}$ respectively. The 3 relations were all inversely proportional to the cell diam. and were expressed by the following schema:

$$\frac{1}{\text{cell diameter}} = \frac{\text{nuclear volume}}{k_1 (\text{cell volume})} = \frac{\text{cell surface area}}{k_2 (\text{cell volume})} = \frac{\text{ectoplasmic volume}}{k_3 (\text{endoplasmic volume})}$$

where k_1 , k_2 , and k_3 are the constants for each relation respectively.—Ivan Pratt.

11581. PIZA, S. de TOLEDO Jr. (U. São Paulo.) Chromosomes with two spindle attachments. *Jour. Heredity* 32(12): 423-426. 2 fig. 1941.—The chromosomes of *Tityus bahiensis* (Buthidae, Scorpiones) are normally provided with a spindle attachment at each end. The repulsion of the ends at metaphase of the 1st and 2d meiotic divisions, the bowing towards the poles at anaphase and the preservation of the pieces originated from spontaneous breakages are the best demonstration of their terminal differentiation.—Auth. summ.

11582. POLLISTER, ARTHUR W. (Columbia U.) The occurrence in the hermaphroditic prosobranch, *Valvata tricarinata*, of typical spermatozoa only. *Anat. Rec.* 81(4): suppl. 77. 1941.—An abstract.

11583. PREER, J. R. (Indiana U.) The effect of temperature on the periodicity of uniparental nuclear reorganization in *Paramecium aurelia*, variety 2. *Anat. Rec.* 81(4): suppl. 131. 1941.—An abstract.

11584. RABINOWITZ, MORRIS. (New York U.) Yolk nuclei in the egg of *Drosophila melanogaster*. *Anat. Rec.* 81(4): suppl. 80-81. 1941.—An abstract.

11585. SCHREIBER, GIORGIO. (São Paulo, Brasil.) Discontinuous and proportional decreasing of nuclear size in the liver of tadpoles during development and metamorphosis. *Anat. Rec.* 81(4): suppl. 80. 1941.—An abstract.

11586. WENRICH, D. H. (U. Pennsylvania.) The chromosome number in *Dientamoeba fragilis* (Protozoa, Sarcomidae). *Anat. Rec.* 81(4): suppl. 34-35. 1941.—An abstract.

11587. WODSEDALEK, J. E. (U. Minnesota.) Fetal membranes as unreliable sources for accurate studies of chromosomes in mammals. *Anat. Rec.* 81(4): suppl. 79. 1941.—An abstract.

11588. WOODARD, T. M. Jr. (Vanderbilt U.) Absence of atypical spermatozoa in *Pomatiopsis lapidaria* (Say). *Anat. Rec.* 81(4): suppl. 77. 1941.—An abstract.

11589. WORLEY, LEONARD G. (Brooklyn Coll.) Observations of vitellogenesis in *Chaetopterus pergamentaceus* Cuvier. *Anat. Rec.* 81(4): suppl. 81. 1941.—An abstract.

GENETICS

Editors: ORLAND E. WHITE, *Plant*; SEWALL WRIGHT, *Animal*

(See also Entries 11553, 11558, 11578, 11647, 11653, 11884, 12078, 12080, 12362, 12470, 12471, 12475, 12495, 12511, 12521, 12535, 12704, 13170, 13189, 13208, 13215, 13222, 13288, 13289, 13300, 13413, 13616, 13882)

GENERAL

11590. GATES, R. RUGGLES. (U. London.) Some recent aspects of genetics. *Proc. Nova Scotian Inst. Sci.* 20(3): 127-140. 1 fig. 1940-1941.—A review.

PLANT

11591. AVERY, A. G., and A. F. BLAKESLEE. (Cold Spring Harbor, N. Y.) A white-flowered race of *Datura* which is genetically distinct from similar white races in nature. *Proc. Nation. Acad. Sci. U. S. A.* 27(11): 512-518. 1941.—*Datura* seed obtained in 1915 gave rise to purple-flowered line 1, and white-flowered line 2. From seeds 7½ yrs. old in line 2 there grew green-stemmed plants which had white flowers. When selfed capsules were planted they segregated into purple and white, indicating a new mutation for white. Various crosses confirm this.—R. A. Muttikowski.

11592. BEADLE, G. W., and E. L. TATUM. (Stanford U.) Genetic control of biochemical reactions in *Neurospora*. *Proc. Nation. Acad. Sci. U. S. A.* 27(11): 499-506. 2 fig. 1941.—By means of x-rays, mutant strains were induced in *Neurospora* which are characterized by their inability to carry out

specific biochemical processes. In one the ability to synthesize vitamin B₆ is largely or wholly lost; in another strain the ability to synthesize the thiazole half of the vitamin B₁ molecule is absent; in the 3d, para-aminobenzoic acid is not synthesized. Inability to synthesize vitamin B₆ is apparently differentiated by a single gene from the ability of the organism to elaborate this essential growth substance. It was later established that inability to synthesize both thiazole and *p*-aminobenzoic acid is also inherited as though differentiated from normal by single genes.—R. A. Muttikowski.

11593. BEARD, DAVID FRANKLIN. (Ohio State U.) Relative values of unrelated single crosses and an open-pollinated variety as testers of inbred lines of corn. *Ohio State Univ. Abst. of Doctor's Dissert.* 33. 9-18. 1940.—Single crosses used as preliminary top cross testers for evaluating inbred lines were comparable in accuracy to an open-pollinated variety. A high-yielding, highly heterozygous single cross gave most accurate evaluations. Relative susceptibility of 7 inbred lines of corn to stalk rot caused by *Diplodia zeae* was correlated (+0.77) with the suscepti-

bility of their respective top crosses. Inbred lines in artificially inoculated single cross combination showed a significant interaction to location with respect to *Diplodia* susceptibility. Susceptibility detd. by artificial inoculation was no indication of what to expect in the way of broken plants.
—From auth. concl.

11594. BEASLEY, J. O. (Agric. Exp. Sta., College Station, Texas.) Hybridization, cytology, and polyploidy of *Gossypium*. *Chron. Bot.* 6(17/18): 394-395. 1941.—*Gossypium* has recently been reclassified by combining forms into < 20 spp. having 13 or 26 haploid chromosome numbers. Those having 26 are native only to the Americas and the islands of the Pacific; those having 13 can be crossed with those having 26 by placing a few of the 26-chromosome pollen grains on a 26-chromosome stigma then dusting it heavily with pollen of parent having the lower number. Hybrids of lower number can be divided into 5 types on basis of meiotic behavior. The Asiatic seems to be the pivot type. 26-chromosome *Gossypium*s are amphidiploids. Doubling the chromosome number in sterile hybrids with colchicine made them fertile. *G. barbadense* has twin (diploid-haploid) embryos occasionally (approx. once in 500 cases).—L. J. Gier.

11595. BURGESS, IVA M. (Agric. Exp. Sta., Orono, Me.) Hybrid vigor in some tomato crosses. *Proc. Amer. Soc. Hort. Sci.* 38: 570-572. 1940.—Among a group of crosses of a crack-resistant selection of Red River with numerous other vars., that with Pritchard was superior to others for production and quality of the crop. Comparisons of this cross with standard early vars. indicate a possible value of hybrid tomato seed for commercial use when the early yield is important.—I. M. Burgess.

11596. DARLINGTON, C. D., and M. B. UPCOTT. (John Innes Hort. Inst., Merton, Eng.) The activity of inert chromosomes in *Zea mays*. *Jour. Genetics* 41(2/3): 275-296. 1 pl., 11 fig. 1941.—The heterochromatic B chromosomes of maize exist in equilibrium in many genetic stocks and vars. The frequency of crossing over within them is less, in proportion to length, than it is in the other (A) chromosomes, and chiasmata are formed closer to the centromere, which lies nearer an end than is the case in any A chromosome. Crossing over in the B chromosomes is increased when their number is odd, due to more frequent changes of partner at pachytene. Because of deficient centromeres and non-pairing, B chromosomes tend to become lost. They are also subject to frequent deletion because of their heterochromatin content, giving rise to b chromosomes. Their maintenance in stocks must be due to some kind of selection pressure, the force of which, judging from the cytological observations, is high. It is suggested that the B chromosomes function in the nucleic acid metabolism of the cell, and under selection may replace the heterochromatic regions of the A chromosomes. This would lead to a division of labor among chromosomes, one group carrying on the determination of gene-controlled processes and a 2d group attending to the maintenance of the mitotic economy.—H. B. Glass.

11597. DODGE, B. O. (New York Bot. Gard.) Heterocaryotic vigor in *Neurospora*. *Bull. Torrey Bot. Club* 69(2): 75-91. 1 fig. 1942.—A new yellow non-conidial dwarf race, Dwarf 16, which by itself grows very slowly, about 2 cm. per week, reacts as a unisexual race, sex a, when grown with the tester races C4 and C8 of *N. tetrasperma*. When this dwarf is grown with race C4, which is of the opposite sex, sex A, nuclear migrations occur so that nuclei of both races come together in a common heterocaryotic mycelium, which shows a great increase in vigor of growth and production of conidia. The new mycelium grows two or three times as fast as does that of race C4. The same phenomenal increase in the growth rate and production of monilioid conidia occurs when Dwarf 16 is grown with race C8, which is of the same sex reaction, sex a. This increased vigor is referred to as heterocaryotic vigor and it is distinguished from individual haploid segregant vigor and from true hybrid vigor which is expressed in connection with diploid organisms. Robbins's hypothesis to account for hybrid vigor, e.g., in tomatoes, may be applied here. That is, the growth substances synthesized by Dwarf 16 supplement those synthesized by race C4 (or C8) so that the heterocaryotic mycelium has an optimum of those vitamin-like substances

that control growth. Preliminary work in crossing Dwarf 16 with race C4 shows that this factor complex is heritable. Some of the haploid segregants carry in turn very similar factors for heterocaryotic vigor.—B. O. Dodge.

11598. HARTWIG, E. E. (U. S. Bur. Pl. Indust.) Inheritance of growth habit, cotyledon color, and cup leaf in *Melilotus alba*. *Jour. Amer. Soc. Agron.* 34(2): 160-166. 1 fig. 1942.—The inheritance of growth habit, cotyledon color, and cup leaf is discussed for several crosses. Two dwarf branching types were studied, F. C. 13074 and F. P. I. 89911. Both of these types were crossed with the common growth type of *M. alba*, with each other, and with Alpha which is also a dwarf branching type. Each of the dwarf branching types differs from the common growth type by a single gene, but each has a different gene determining the dwarf branching character. These genes have been symbolized: d_1 —Alpha; d_2 —F. C. 13074; and d_3 F. P. I. 89911. The symbol d_4 was reserved for a previously described type not used in this investigation. Evidence is given to show that green cotyledon is a simple recessive to yellow cotyledon. However, when the green cotyledon type is used as the maternal parent the F₁ cotyledon is usually the same shade of green as the maternal type, but under some environments the F₁ cotyledon is a yellowish green. The green cotyledon type was considered to carry the genes i , and the yellow cotyledon type the gene I which causes the green pigment to fade at maturity. However, the gene I can not act in the cytoplasm of the i parent, except to a limited extent under some environmental conditions. A cup leaf character was isolated and described. This character behaves as a simple recessive to the normal leaf. The gene involved is symbolized c . In a cross involving the 3 characters, cup leaf, green cotyledon, and dwarf branching type F. C. 13074, the genes, c , i , d_3 , were found to follow independent assortment.—E. E. Hartwig.

11599. JONES, HENRY A., and ALFRED E. CLARKE. (U. S. Hort. Sta., Beltsville, Md.) A natural amphidiploid from an onion species hybrid *Allium cepa* L. \times *Allium fistulosum* L. *Jour. Heredity* 33(1): 25-32. 2 fig. 1942.—A fertile amphidiploid has been obtained from the cross *A. cepa* L. \times *A. fistulosum*. This amphidiploid shows greater vegetative vigor than either parent, as evidenced by increased height, larger stomata, larger flowers, larger pollen grains, greater wt. of seed, and more rapid growth of seedlings. It is a perennial like *A. fistulosum*. Bulbing is intermediate. Second-generation plants are very uniform in appearance and set seed readily. The haploid number of chromosomes is 8 in both parent sp. and 16 in the amphidiploid. Meiotic behavior is fairly regular. 16 bivalents are generally found at 1st metaphase. Fragments, chromatin bridges, and micronuclei are observed but are less frequent than in the sterile diploid hybrids obtained from the same species cross. During meiosis both the random and localized type of chiasma formation are found in different bivalents in the same cell.—A. E. Clarke.

11600. KOSHAL, R. S., A. N. GULATI, and N. AHMAD. The inheritance of mean fibre-length, fibre-weight per unit length, and fibre-maturity of cotton. *Indian Jour. Agric. Sci.* 10(6): 975-989. 1 fig. 1940.—The data secured from the growth at Indore, India, of 3 vars. of cotton and their F₁ hybrids gave a positive and significant correlation between fiber-maturity and fiber-wt. for plants within the same plot. The correlation between fiber-length and fiber-wt. per unit length for vars. was negative and significant. The hybrids between one var. and the other 2 vars. gave significantly higher fiber length and fiber-maturity and lower fiber-wt. than cross between the latter 2 vars.—C. H. Arndt.

11601. NANDI, H. K., and P. M. GANGULI. Inheritance of earliness in Surma Valley rices. *Indian Jour. Agric. Sci.* 11(1): 9-20. 6 fig. 1941.—Hybrids derived from crosses between a var. of summer rice and an autumn rice indicate that the time of maturity is due to multiple factor inheritance. Similar crosses between an autumn and a winter rice gave in F₂, 3 late:1 early. Crosses between summer and winter rices also indicated multiple factors. In the F₂ and F₃ no plants were secured which were earlier than the early parent. Some, however, were later than the late parent.—C. H. Arndt.

11602. NEWCOMER, EARL H. (U. North Carolina.) A colchicine-induced tetraploid cabbage. *Amer. Nat.* 75

(761): 620. 1941.—Tetraploidy in cabbage (var. Ferry's Hollander) was produced by colchicine treatment of seedlings. The tetraploids thus produced were rather highly fertile. In addition to polyploidy, cytological examination revealed the appearance of mixoploidy and periclinal chimeras. Preliminary observations of the tetraploids showed the usual enlargement of pollen grains, stomata, and inflorescence. Some triploid seeds were produced when 2n pollen was used.—E. H. Newcomer.

11603. ONO, HUMIHIKO. (Tokyo U.) Intergeneric hybridization in Cichorieae, V. Variation in karyotypes and fertility of *Crepidiastrix eris denticulata-platiphylla*. *Cytologia* 11(3): 338-352. 1941.—There was considerable variation in fertility and karyotypes of plants found in nature. Plants with the mean number of florets were those highest in fertility. The frequency and fertility decrease with both the increase and decrease of the number of florets. The number of involucre scales seems to be conditioned by polymeric genes. A monosomic, a diploid-tetraploid chimera, and a tetraploid were found. In the tetraploid plant a regular formation of tetravalents was observed.—Taylor Hinton.

11604. PAL, B. P., and S. RAMANUJAM. A new type of variegation in rice. *Indian Jour. Agric. Sci.* 11(2): 170-176. 1 fig. 1941.—The variegated plants have fine stripes of green and white on the stem, foliage and glumes; they are weaker than the green plants, with narrower leaves and poorer seed-setting. When selfed, they give rise to variegated plants and albinos in varying proportions; when crossed reciprocally with green plants, they give rise to normal greens in the F_1 . Heterozygous green plants segregate into greens and variegated in the ratio of 3:1, no albinos are present in the progenies. The breeding behaviour of variegated plants in selfed and crossed progenies has shown that variegation is a mendelian recessive to green, but albinism is transmitted only maternally.—Auth. summ.

11605. RAMIAH, K., and P. D. GADKARI. Further observations on sterility in cotton. *Indian Jour. Agric. Sci.* 11(1): 31-36. 3 fig. 1941.—Cytological studies of 2 sterile mutants of "Million Dollar" cotton show that the sterility is due to the asynapsis of the sterility-producing gene, which may be linked with those controlling flower color, anthocyanin formation, and leaf shape.—C. H. Arndt.

11606. SCHAFER, BRENHILDA. (John Innes Hort. Inst., Merton, Eng.) The genetics of *Aquilegia vulgaris*. *Jour. Genetics* 41(2/3): 339-347. 1941.—Four gene loci have been analysed in *A. vulgaris*: *B/b*, blue/pink flower color; *C/c*, tall/compact habit; *L/l*, blue/purple flower color; *A/a^w/a*, whole color/white face/white. *c-l-a* are linked in that order, recombination being $4.3 \pm 9\%$ for *c-l*, and $13.1 \pm 1.7\%$ for *l-a*. *B/b* assort independently of the *c-l-a* linkage group. Doubleness is also normally independent, but linkage was found in one family.—H. B. Glass.

11607. SHULL, GEORGE HARRISON. (Princeton U.) New mutational segregations from *Oenothera* mut. *erythrina* de Vries. *Proc. Amer. Phil. Soc.* 85(2): 183-214. 28 fig. 1942.—*O. mut. erythrina*, when selfed, is known to produce in every progeny 2 types, 1 repeating the parent, the other a new type, seg. *decipiens*, which breeds true when selfed because it lacks both of the balanced lethals which characterize *O. lamarckiana*. *Erythrina* splits in this way because it has only one of the *lamarckiana* lethals. Some years ago the author reported the occurrence of a new mutational segregation in which mut. *pollicata* was found to characterize the *decipiens* component of such a splitting progeny, while normal hypanthium, styles and stigmas characterized the *erythrina* component. A continuation of studies with *erythrina* have brought to light a number of new segregations, sometimes replacing *decipiens*, in other cases being additional to *decipiens*. The first of these new mutational segregates was discovered in 1935, when family 3435, produced from a self-fertilized *erythrina* mother, was observed to split out 45 plants of a peculiar new type afterwards called seg. *petiolaris*, in a total progeny of 164. A complete analysis of this family showed it to consist of 70 *erythrina*, like the parent, 50 seg. *decipiens*, 43 seg. *petiolaris*, and 1 unidentified mutant. Over half of the *erythrina* plants in such a family repeat the 3-way split when selfed, while the rest split only to *erythrina* and *decipiens*. Subsequently (1938), another remarkable new segregation, seg. *contracta*,

was discovered in family 37428, derived from an *erythrina* mother in this same strain. The unique feature this time was not alone the remarkable modification represented by the new type itself, but seg. *contracta* replaced seg. *decipiens*. Family 37428 consisted of 61 *erythrina* and 40 *contracta*, no *decipiens* being present. Every *erythrina* plant in such a family produced the same kind of a family, consisting of *erythrina* and *contracta*. In 1939 another new segregate, seg. *diminua*, was found, and in 1940, still another, seg. *cyanea*, was added to a *contracta*-segregating family (39533) which split to 61 *erythrina*, 25 *contracta*, 16 *cyanea*. In 1941 one family (40110) from selfed *erythrina* has had the *decipiens* segregate replaced by seg. *elongata* and in another progeny (40130) seg. *retracta* has replaced seg. *contracta*. An essentially true-breeding *erythrina* has resulted when seg. *decipiens* was replaced by seg. *sublethalis*, the latter being rarely seen because it has so little chlorophyll that usually it does not live beyond the germination stage. This "non-splitting" *erythrina* was discovered in 1938 in family 37411, but seg. *sublethalis* was not observed until the current year (1941).—Auth. abst.

11608. WANG, YUN-CHANG. Rust reactions of Chinese wheat varieties and certain Canadian hybrid strains. *Canadian Jour. Res. Sect. C. Bot. Sci.* 20(2): 108-115. 1942.—About 160 Chinese spring wheats and a number of Chinese winter wheats were tested in the seedling stage in the greenhouse to determine their reaction to 8 races of stem rust (*Puccinia graminis tritici*) and to 4 races of leaf rust (*P. triticina*). The spring wheats were also subjected, in the field, to epidemics of stem rust and leaf rust in which a large number of races of each rust were employed. The wheats were classified as one or another of the following spp.: *Triticum vulgare*, *T. compactum*, *T. durum*, and *T. turgidum*. By means of these tests, it has been demonstrated that the Chinese wheats are rather highly susceptible to the races of stem rust prevalent in N. America. Many of the wheats showed, however, considerable resistance to leaf rust in both the greenhouse and the field tests. Vars. resistant to leaf rust were present in all of the 4 above-mentioned spp. 75 lines of Canadian spring wheat, derived from a cross between Renown Selection, which is resistant to stem rust and moderately resistant to leaf rust, and Garnet, which in N. America is resistant to stripe rust (*P. glumarum*), were tested in the seedling stage in the greenhouse for their reaction to stripe rust. Two races (race 6 and race 13) were used in these tests. The same lines were subjected to rust epidemics in the field to determine their resistance to stem rust and leaf rust. Several of these lines were found to possess resistance to all 3 rusts. These lines may prove valuable breeding material in case it is desired to develop by breeding methods Chinese vars. resistant to all 3 of these rusts.—From auth. abst.

11609. WEDDLE, CHARLES. (Cornell U., Ithaca.) A species hybrid of *Calendula*, its F_2 population and its tetraploid. *Proc. Amer. Soc. Hort. Sci.* 39: 393-396. 1941.—*Calendula officinalis* was crossed with *C. suffruticosa*. The hybrid showed considerable heterosis. The reddish brown color of the disk florets in *C. officinalis* was dominant over yellow disks in the F_1 . Singleness of flower head (2 whorls of rays) as found in *C. suffruticosa* is dominant over doubleness (many whorls of rays) which is characteristic of the cultivated vars. of *C. officinalis*. F_2 ratios indicated that a single pair of genes is responsible for the brown disks and that duplicate factors are responsible for singleness. Back-cross data substantiate this hypothesis. Hybrid plants were treated with colchicine producing fertile tetraploids which because of their size and beauty may become a valuable garden and greenhouse var. The tetraploid hybrid was named *C. officicosa* and is descr. by G. H. M. Lawrence. Chromosome counts in the material used were as follows: *C. officinalis*—16 pairs, *C. suffruticosa*—16 pairs, the diploid hybrid—16 pairs with quite normal pairing, and *C. officicosa*—ca. 32 pairs.—Charles Weddle.

11610. WELLER, D. M. (Hawaiian Sugar Planters' Assoc.) Colchicine in relation to sugar cane breeding. *Hawaiian Planters' Rec.* 44(4): 251-261. 11 fig. 1940.—A review of previous work with colchicine is followed by brief results obtained with sugar cane. Seeds treated with colchicine showed an increase in % of germination and also a stimulation of growth of seedlings. Pollen grains on stalks

developing from colchicine-treated buds were several times larger than normal ones.—C. W. Edgerton.

11611. WHITAKER, THOMAS W. (U. S. Hort. Field Sta., La Jolla, Calif.) The occurrence of a spontaneous triploid celery. *Proc. Amer. Soc. Hort. Sci.* 39: 346-348. 1 fig. 1941.—An aberrant celery plant discovered in cultures of *Apium prostratum* proved to be a triploid ($2n=33$). Strong circumstantial evidence indicates that this plant resulted from the fertilization of an unreduced egg cell of *A. prostratum* ($2n=22$) by a normal sperm of *A. graveolens* ($2n=22$).—T. W. Whitaker.

11611A. WRIGHT, SEWALL. (U. Chicago.) On the probability of fixation of reciprocal translocations. *Amer. Nat.* 75(761): 513-522. 1941.—The chance of fixation of a reciprocal translocation in a population of plants with exclusive sexual reproduction is of the order 10^{-3} if the effective population number (N) is 10. It is of the order of 2×10^{-6} in groups of 20 individuals and of the order 3×10^{-14} in groups of 50 individuals. It is assumed that the heterozygotes are semisterile, and that there is no compensating advantage in semisterility by reduction of competition among the progeny and that the translocation has no advantage per se. These figures may be compared with $1/2N$, the chance of fixation of an indifferent mutation. Reciprocal translocations in animals have a slightly better chance of fixation than in plants in populations of the same effective size, even if only the balanced types are viable and fertile. Cases in which the heterozygous unbalanced types are at no disadvantage in viability and in number of gametes produced, only the homozygous deficiencies being eliminated, have considerably better chances of fixation than in the cases above. The chance is roughly 3×10^{-3} in populations of 20, 4×10^{-6} in populations of 50, 3×10^{-10} in populations of 100 and 5×10^{-18} in populations of 200. In all the cases given here, there is an element of uncertainty, as a result of which the true chance may be smaller or greater by a small factor (<4).—Sewall Wright.

11612. YASUI, KONO. (Tokyo U.) Cytogenetic studies in artificially raised interspecific hybrids of *Papaver*. VIII. F_1 plants of *P. bracteata* \times *P. lateritium*. *Cytologia* 11(3): 452-463. 1941.—In the F_1 plants some characteristics were intermediate between those of the parent plants, but many of the ♂ (*lateritium*) parent dominated. Although the chromosome number of the parent plants was the same, those of the *lateritium* were smaller, yet the variation in chromosome size was greater in the hybrid than in either parent. At meiosis most of the chromosomes were univalents going at random to the poles and preceding the bivalents. The bivalents may go to the poles without separation. High sterility resulted. The univalents were connected to one pole by a traction fibre which may determine their course of movement.—Taylor Hinton.

ANIMAL (EXCEPT MAN)

11613. BARTELS, E. D. (U. Copenhagen.) Studies on hereditary dwarfism in mice. III. Development of the adrenals in dwarf mice. *Acta Path. et Microbiol. Scand.* 18(1): 20-35. 1941.—In the development of the adrenal gland in mice a sudanophobic zone, called the X-zone, is formed between the medulla and the cortex. The author believes that it develops from the cortex. It first appears at 10 days, and, in the ♂, begins to degenerate at the age of 4 weeks and has disappeared by the 6th week. In the ♀ degeneration begins from 7-13 weeks and is complete by the 11th-29th week. In hypophyseal dwarf mice the X-zone of both sexes behaves as the X-zone of the normal male. In the dwarfs a partially sudanophobic zone is sometimes seen on the inner side of the cortex after the X-zone has disappeared. This is probably due to the fact that the dwarf mouse behaves as though it had undergone partial hypophysectomy.—Ethel McNeil.

11614. CARSON, HAMPTON L. Jr. (U. Pennsylvania.) Linkage, interference and semilethals in the white group of *Habrobracon*. *Amer. Nat.* 75(761): 608-614. 1941.—In *H. juglandis*, the recessives broken (wings), stumpy (legs) and white, or its allele, carrot (eyes) show linkage in that order by $25 \pm$ and $9 \pm$ crossover units respectively. Semilethal factors to the left of broken cause deviations from expected ratios; frequency of the broken class relative to the alternative is highest for the straights and the crossovers

between stumpy and white, as might be expected if crossovers between broken and white interfere with crossing over between the semilethal and broken.—H. L. Carson, Jr.

11615. CASTLE, W. E. (U. California.) Size inheritance. *Amer. Nat.* 75(760): 488-498. 1941.—The multiple factor hypothesis is correct in the assumption that many independent genes influence body size, but it is not true that all such gene influences are quantitatively equal or act in one direction only, either plus or minus. Exptl. mouse crosses show that a majority of the common mutant genes have also an influence on body size, some increasing body size, others decreasing it, and still others being neutral. Brown and blue dilutions increase body size and their action is additive. The interaction of brown with leaden and pink-eye₂ is peculiar in that the retarding effect of leaden and pink-eye₂ on growth, instead of being counteracted by brown, is intensified by it. The mother exerts greater influence than the father on the body size of offspring, as shown by the result of reciprocal crosses between races of unlike body size. The offspring are regularly closer to the mother's race than to that of the father in size. This is due in part to gestational influences, in part to cytoplasmic constitution of the egg. The action of size genes is chiefly general through control of developmental rate of the embryo, as a whole, but in part through control of the developmental rate of groups of organs, or of single organs independent of general body size, as shown by Wright.—W. E. Castle.

11616. COLE, LEON J., and HAROLD E. FINLEY. (U. Wisconsin.) Production of somatic mutations in the pigeon with x-rays. *Anat. Rec.* 81(4): suppl. 48. 1941.—An abstract.

11617. CUMLEY, R. W., M. R. IRWIN, and L. J. COLE. (U. Wisconsin.) Genic effects on serum proteins. *Proc. Nation. Acad. Sci. U. S. A.* 27(12): 565-570. 1941.—The antigens in the serum of Pearlneck, specific for that species as contrasted with Senegal pigeons, have been found to segregate in back crosses in accordance with genetic expectation. The results of this and previous investigations show beyond reasonable doubt that the species-specific qualities of the serum proteins are detd. by gene action and suggest that the total protein complex of the serum is likewise detd. by genes. The genes that in Pearlneck produce the serum antigen are not the same as those that produce the cellular antigens, and possibly are not on the same chromosomes.—Authors.

11618. DRY, F. W., and J. A. SUTHERLAND. (Massey Agric. Coll., Palmerston North, New Zealand.) A Mendelian situation in the birthcoat of the New Zealand Romney lamb. *Nature [London]* 148(3758): 563. 1941.

11619. GORDON, C., and J. H. SANG. (U. Aberdeen.) The relation between nutrition and exhibition of the gene Antennalless (*Drosophila melanogaster*). *Proc. Roy. Soc. Ser. B: Biol. Sci.* 130(859): 151-184. 10 fig. 1941.—In normal cultures of *D. melanogaster* containing the gene Antennalless, phenotypic indices of pure lines are at first high, then decline to a minimum about the 4th day, and subsequently rise to near the initial level. This is not due to selective mortality of genotypes distinguished by modifiers of Antennalless, but results from external changes in the normal culture media. Successive changes of exhibition frequency can be correlated with gross changes due to the activities of the larvae and to biochemical changes in the yeast diet arising from differential fertility or mortality of yeast strains and from direct action of changing conditions upon the metabolism of the microflora. Yeasts produce one group of substances which encourage and one group which inhibit exhibition of the gene Antennalless. A provisional hypothesis is that transition from the descending to the ascending phase of exhibition coincides with change from aerobic to anaerobic respiration of the yeasts. This, in turn, affects the relative concs. of specific nutritional products which influence exhibition.—F. R. Hunter.

11620. GORDON, MYRON. (New York Aquarium.) Hybridization in seven species of Mexican fishes following removal of the geographical factors of isolation. *Anat. Rec.* 81(4): suppl. 112-113. 1941.—An abstract.

11621. GOWEN, JOHN W. (Iowa State Coll.) X-ray induced changes in *Drosophila* and selective fertilization. *Anat. Rec.* 81(4): suppl. 48. 1941.—An abstract.

11622. GRÜNEBERG, HANS, JOSHUA B. BURNETT,

and GEORGE D. SNELL. (*Jackson Mem. Lab., Bar Harbor, Maine.*) The origin of jerker, a new gene mutation of the house mouse, and linkage studies made with it. *Proc. Nation. Acad. Sci. U. S. A.* 27(12): 562-565. 1941.—A hybrid of the house mouse and a Japanese waltzer gave 3 normal animals. After 11-12 days "jerking" appeared, indicated by poor balance, shaking the head and traveling in a circle. The jerkers appear to be stone-deaf. Various crosses indicate that no linkage exists with the characters tested.—R. A. Muttikowski.

11623. HARMAN, MARY T., and FRANCES NELSON. (*Kansas State Coll.*) Polydactyl feet of two strains of chicks. *Amer. Nat.* 75(761): 540-549. 1941.—Two strains of polydactyl chicks were found among the birds belonging to the Poultry Dept. of Kansas State College: in one of these strains the hallux was usually duplicated; the other strain had either 3 or 4 phalanges instead of 2 phalanges and a metatarsal which occur normally. Embryos and hatched chicks were studied. Although a large amount of variation occurred in both strains of chicks, the feet of the duplicate polydactyl strain were grouped into 6 classes and those of the polyphalangeal polydactyl into 3 classes, based upon the number and arrangement of the phalanges composing each hallux. No consistent bilateral variations were evident in either strain. Whenever 2 or more halluces were present the longer hallux was usually on the outside. Never more than 2 metatarsals for the halluces of the duplicate polydactyl strains were present, and only 1 was present for the polyphalangeal polydactyl strain.—M. T. Harman.

11624. KAALUND-JØRGENSEN, O. (*Carlsberg Found., Copenhagen.*) On the occurrence of diverse leucotic conditions in an inbred mouse strain. *Acta Path. et Microbiol. Scand.* 17(4): 438-452. 1940.—In studies of 2 generations of an inbred strain of mice, the author found some type of leucosis in 9 of 14 animals which lived 4 months or longer. There were 4 cases of generalized lymphomatosis, 2 of lymphatic leucemia, 1 atypic leucemia and 1 reticuloma. He concludes that the tendency to malignant degeneration of the hematopoietic system is inherited, but that the type of leucosis is detd. by non-chromosomal factors.—Ethel McNeil.

11625. KALISS, NATHAN. (*Columbia U.*) The inheritance of "white-belly" in the house mouse. *Jour. Heredity* 33(1): 21-23. 1 fig. 1942.—The genetics of a new factor for coat color in the house mouse is descr. The phenotypic expression of this factor is a "white-belly" in which the hairs of the ventrum do not have any yellow pigment, and very little, or no, black pigment. The factor is partially dominant to "yellow-belly," and segregates independently from the agouti locus. Animals heterozygous for white-belly and yellow-belly are "gray-belly," i.e., the ventral hairs have some black pigment.—Nathan Kaliss.

11626. KALMUS, HANS. (*U. Coll., London.*) The resistance to desiccation of *Drosophila* mutants affecting body colour. *Proc. Roy. Soc. Ser. B: Biol. Sci.* 130(859): 185-201. 3 fig. 1941.—The offspring of a $y/y^+ \times y$ cross in *D. melanogaster*, *simulans*, *subobscura* and *pseudoobscura* race A showing phenotypically yellow body color die earlier when starving in dry air (0% rel. humidity and 25° C) than flies of wild type body color which differ in respect of one gene. The yellow flies also lose more weight. In *D. melanogaster* F_2 flies of black or ebony body color survive longer and lose less wt. under these conditions than their wild type sibs. These differences are smaller at 70% rel. humidity, and disappear at 100% moisture. In the presence of drinking water, yellow ♀♀ of all 4 spp. frequently survive longer than wild type ♀♀. Most of these differences in survival time and loss in wt. may be due to differences in the resistance to evaporation, which can be assumed to vary with the body color. This assumption is supported by recent results of Fraenkel and Rudall (1940). Secondary differences due to differences in melanogenesis are discussed. The ecological meaning of these findings is under investigation.—Auth. abst.

11627. KEELER, CLYDE E. (*Wistar Inst.*), and HELEN DEAN KING (*U. Pennsylvania*). Multiple effects of coat color genes in the Norway rat, with special reference to the "marks of domestication." *Anat. Rec.* 81(4): suppl. 48-49. 1941.—An abstract.

11628. LAMOREUX, W. F., and F. B. HUTT. (*Cornell Agric. Exp. Sta.*) Variations in the down color of White Leghorn chicks and their economic insignificance. *Jour. Agric. Res.* 64(4): 193-205. 1 col. pl. 1942.—From a stock of White Leghorns there were differentiated 2 strains—one in which about 83-94% of the chicks had dark down, and one in which only 3 to 12.5% had dark down, the remainder grading as medium or light in color. In F_1 generations from reciprocal crosses between these 2 strains, the proportion of dark chicks was intermediate between those in the parent strains. However, among the F_1 progeny from dark dams there was a higher proportion of dark chicks (63.6%) than in F_1 chicks from light dams (24.6%). Sex-linked genes were not primarily responsible for differences in down color. Color of down was quite unrelated to size at hatching, early growth, age at sexual maturity, viability, and ability to lay eggs. In wt. at first egg, the darker chicks were consistently heaviest, and the paler chicks lightest, but it is not clear that these associations are significant. Dark spots in the occipital region of the head occurred in 99% of chicks in the dark strain, 36% of those in the light strain, and 76% of unselected control chicks. In all strains they were most frequent in dark chicks and least so in light ones. They were more frequent in ♂♂ than in ♀♀.—W. F. Lamoreux.

11629. LEVIN, HERBERT J., and MORRIS H. HARNLY. (*New York U.*) The relationship of the second larval molt to the beginning of the temperature-effective-period in *Drosophila melanogaster*. *Anat. Rec.* 81(4): suppl. 86. 1941.—An abstract.

11630. MØLLENBACH, C. J. (*U. Copenhagen.*) Studies on hereditary dwarfism in mice. IV. On the function of metabolic active hormones in the anterior pituitary dwarf mouse. *Acta Path. et Microbiol. Scand.* 18(2): 169-185. 1941.—This type of hereditary dwarfism is caused by a lack of eosinophile cells in the anterior lobe of the pituitary body. The liver of the dwarf mice contains more than the normal amt. of glycogen, but very little fat. When mice are starved, the normal ones are able to make rapid use of the glycogen, but only slowly break down the fat; dwarf mice can make rapid use of what little fat has been deposited, but are unable to use the glycogen. The dwarfs show a greater sensitivity to insulin, as detd. by the appearance of hypoglycemic cramps, than normal mice. It is assumed that the lack of eosinophile cells in the pituitary body causes a hypo-secretion of one or several metabolic hormones.—Ethel McNeil.

11631. MOORE, JOHN A. (*Queens Coll.*) A genetical analysis of *Rana burnsi* Weed. *Anat. Rec.* 81(4): suppl. 71. 1941.—An abstract.

11632. VANDEL, ALBERT. Les mutations chez des Isopodes terrestres. *Compt. Rend. Acad. Sci. [Paris]* 210(6): 231-234. 1940.—19 mutations of the terrestrial Isopods were studied. Some were collected but the most of them were obtained from among 2d and 3d generation "consanguines" resulting from breeding expts. The mutations related to character of coloring are divisible into 5 categories: (1): Complete albinism; (2): *Pallida* type, incomplete albinism; (3): *Cooperi* type, in which the pigment occurs only on the head, the antennae and the median region of the pereion; (4): *Ligia* type, in which the chromatophores remain distinct and separate, instead of forming a complex network enclosing the muscular insertions, which remain unpigmented; (5): reddishness, which probably can be considered an arrested stage in the development of the black pigment. Some or all of these were found among representatives of the genera *Trichoniscus*, *Chaetophiloscia*, *Metaponthus*, *Philoscia*, *Ligia*, *Tylus* and *Armadillidium*. The mutations are believed not the result of chance but indicative of evolutionary tendencies in the group.—D. H. Rose.

11633. WOOLLEY, GEORGE W. (*Roscoe B. Jackson Mem. Lab., Bar Harbor, Me.*) "Misty," a new coat color dilution in the mouse, *Mus musculus*. *Amer. Nat.* 75(760): 507-508. 1941.—A new mutation *m* (misty) has been found in *M. musculus*. Misty is a dark-eyed coat diluting character not allelomorphic to other known dark-eyed dilutions, the albino alleles *ce* and *co*, leaden *lnln* or blue dilution *dd*. *mmbbaa* and *mmBBaa* mice are more uniform and more intense in color than *lnlnBbaa*, *lnlnBBaa*, or *ddBbaa* and

ddBba mice. Microscopic examination of the hairs shows *mm* individuals to have much more cortical pigment than *dd* or *lnln* mice on both *bbaa* and *BBaa* backgrounds.—*G. W. Woolley.*

MAN

11635. HALDANE, J. B. S., and ROSAMUNDE POOLE. (*Rothamsted Experiment Sta.*) A new pedigree of recurrent bullous eruption of the feet. *Jour. Heredity* 33(1): 17-18. 1 fig. 1942.—A pedigree of recurrent blistering of the feet, due to an autosomal dominant gene, is described. The condition probably originated by mutation. The same or a very similar condition has previously been described in 2 other families by Cockayne.—*Auth. summ.*

11636. HESSE, ERICH. (*Univ. Eye Clinic, Graz.*) Beitrag zum Beginn und zur Erblichkeit der gittrigen Hornhautdystrophie. *Albrecht von Graefe's Arch. Ophthalmol.* 141(1): 1-19. 1940.—The genealogical table of a family is given in which 8 members of 3 generations suffer from reticular dystrophy of the cornea. The dominant character of the heredity of this affection is substantiated. The initial changes in such cases can be divided into 3 types: a) finely ramified reticular lines; b) polygonal or star-shaped opacities in the center of the cornea, and c) circular streaks of opacities in the periphery of the cornea.—*Arthur Linksz.*

11637. OHM, J. Familiäres Vorkommen des Augenzenters der Bergleute. *Albrecht von Graefe's Arch. Ophthalmol.* 141(1): 20-31. 1940.—Miner's nystagmus often shows striking similarities in members of one family. Peculiarly enough, the similarities are greater between members of one and the same age-group (brothers, cousins) rather than among those of different age-groups (father and son, uncle and nephew).—*Arthur Linksz.*

11638. SNYDER, LAURENCE H. Medical genetics. viii+

130p. Duke University Press: Durham, 1941. Pr. \$1.50.—The book deals with the inheritance of various conditions in man which are important from the standpoint of medicine. The several types of hereditary behavior are outlined in connection with specific traits the first time that each kind of genetic behavior is encountered. The practical applications of the knowledge of human heredity are considered in detail. These applications include diagnosis, prevention, medico-legal cases and prognosis. Separate chapters are concerned with mental disorders, abnormalities of the skin, skeleton and muscles, diatheses and susceptibilities, diseases of the blood, and cancer. The final chapter discusses the future development of medical genetics. Tables are presented of the diseases of various systems of the body, in which the hereditary characters are set out in relief against a background of conditions for which no genetic basis is known. Selected family histories are included in the book, as well as a series of photographs of various abnormalities.—*L. H. Snyder.*

11639. SZINEGH, BELA. (*Univ. Eye Clinic, Debrecen.*) Über Einwirtsschienen bei Myopie. *Albrecht von Graefe's Arch. Ophthalmol.* 142(1/2): 176-184. 1940.—The case histories of 3 myopes with convergent strabismus (c. s.) are given. In the first case the mother was myopic, the father hyperopic, the latter's brother had a c. s.—In the 2d case, subject's father and father's father myopic, mother hyperopic, her brother had c. s., 2 siblings myopic, subject's son myopic.—In the 3d case father suffers from c. s., is emmetropic, mother emmetropic. No relatives could be examined. Mother's parents and grandparents used no glasses in old age.—These cases are taken as evidence that myopia and strabismus are independent hereditary units and that anomalies of refraction are not responsible for squint.—*Arthur Linksz.*

HUMAN BIOLOGY

(See also Physical Anthropology; and Entries Agriculture of the American Indians, 11512, 12418; Alcoholism, 11522, 12395; Medical genetics, 11638; Behavior of gorilla in captivity, 11651; Genetic differences in behavior traits, mice, 11653; Diet of laborers, Trinidad, 11898; Estrogen cycle, 12275; Hypothalamus as center of emotion, 12331; Blood pressure studies, Panama, 12360; Blood pressure and pulse in emotional stress, 12365; Physiol. of drug addiction, 12386; Evidences of intoxication, 12400; Development of rotary-vestibular reactions, 12425; Sensory development in infant, 12426; Individual differences in autonomic balance, 12427; Brain potentials and morphine addiction, 12557; Involutional psychoses, 12564; Body type and pneumoconiosis, 12572; Measurement of volume of finger and toe, 12632; Emotion and whealing response to cold, 12786; Emotional relations in allergy, 12793, 12794, 12799; Life expectancy and climate, Mexico, 12890; Disabling sickness in industrial workers, 12901; Multiple sclerosis incidence, 12913; Tuberculosis control in Amer. Indians, 12933)

11640. COOK, O. F. A scientific approach to African colonization. *Jour. Washington Acad. Sci.* 32(1): 1-17. 1 fig. 1942.—The author briefly reviews the problems of negro slavery and the development of anti-slavery movements from Smeathman's proposal for establishing a colony for repatriated negroes in Africa at the close of the 18th century to the establishment of Liberia. He implies that further repatriation should be investigated in a scientific manner, if only to avoid the deteriorating effects of genophytic hybridization. He points out that racially the inherent social organization of the negro is different from that of the white race and that this accounts for the generally inferior position of the negro in white countries although the individuals of the negro race are capable of high development. It is urged that considerable scientific thought be directed to a thorough study of the problem in the light of the type of economy that might be established on the west coast of Africa. Lack of understanding of the ecology of Africa is blamed for the rapidly expanding desert area and C. suggests that tree crops be the basis of the economy. It is C's suggestion that a sufficient number of negro scientists be trained to carry out the necessary research in the field since the country is distinctly inimical to whites but not to negroes.—*F. M. Brown.*

11641. DEEGAN, WILLIAM. (*Yale U.*) A fifty-nine year survey at Yale reveals freshmen are becoming younger, heavier, and taller. *Res. Quart. Amer. Assoc. Health, Phys. Educ. and Recreation* 12(4): 707-711. 1941.—Age, height, and weight records of 32,000 Yale freshmen of the years 1883-1941 are analyzed. Av. age has decreased from 18.9 to 18.44 yrs.; av. wt. has increased from 135.47 to 150.09 lbs.; av.

height from 67.74 to 69.83 in.; and % of men over 6 ft. from 4.5 to 19.8. For the 59-yr. period the height range is 54.7 in. to 80.7 in.; the wt. range, 75 lbs. to 265 lbs.—*Eleanor Metheny.*

11642. MYERSON, A. Neuroses and alcoholism among the Jews. *Med. Leaves* 3: 104-107. 1941.—The modern trend in psychiatry to attribute alcoholism to frustration, to neuroses, is contraposed to the fact that while neuroses are very frequent among Jews, alcoholism hardly exists. The social reasons in the history of the Jews which contributed to the development of neuroses among them are briefly described. "The fundamental etiologic background of alcoholism is the social tradition of the group." The Jews are said to have set up a powerful social tradition against alcoholism.—*From review in Quart. Jour. Stud. Alcohol.*

11643. POLLOCK, H. M. Mental disease and social welfare. iv + 237p. State Hospitals Press: Utica, 1941. Pr. \$2.—Republished in book form are 16 special research studies designed to contribute to psychiatric knowledge or to serve administrative or preventive purposes, particularly in relation to social welfare and the treatment and prevention of mental disorders. They are based primarily on New York State statistics. Representative chapter headings are: the expectation of mental disease; economic loss to New York State and the United States on account of mental disease, 1931; the depression and mental disease in New York State; trends in outcome of general paresis; recurrence of attacks in manic-depressive psychoses; mental disease in the U. S. in relation to environment, sex and age, 1922; what happens to patients with mental disease during the first

year of hospital life; a statistical study of 1,140 dementia praecox patients treated with metrazol; mental disease in Peru; 30 years of alcoholic mental disease in New York State; and is the paroled patient a menace to the community? Index.—*M. H. Erickson (in Psychological Abst.)*

11644. STODDARD, GEORGE D. (*U. Iowa.*) Patterns of growth in human intelligence. *Proc. Nation. Acad. Sci. U. S. A.* 27(12): 551-555. 1941.—Mental growth should be correlated with age. However, there are debilitating forces,

as follows: bad health conditions (e.g., nutritional, endocrinial or infectious) which may retard children and bring adults to a full stop; the mechanisms of escape, retrospection and rigidity which result in partial or complete regression to more primitive intellectual patterns; lack of mental exercise—a failure to undertake new abstract learning as appropriate to adults as school and college are to the young. A systematic program is desirable.—*R. A. Muttkowski*.

ANIMAL BEHAVIOR

(See also Entries African game spp., 11506; Temp. preferendum of insects, 11660; Behavior responses of opossum to gonadotrophin, 12107; Endocrine control of sex maturity, 12155; Induction of mating behavior by sex hormones in chicks, 12189; Intersexes in domestic fowl, 12159, 12276; Sexual status and behavior in chimpanzee, 12310; Muscular tension during learning, 12350; Response of insects to color, intensity and distr. of light, 13479; Host selection, 13535; Migration and righting in coral, 13626; In coordination in 8-rayed starfish, 13694; Circling in water beetle, 13754; House sparrow, 13968; Role of territory in bird life, 14028; Bird migration, 14056)

11645. ALLEE, W. C., and BENSON GINSBURG. (*U. Chicago.*) Recent experience and aggressiveness in male mice; a study in social dominance. *Anat. Rec.* 81(4): suppl. 50. 1941.—An abstract.

11646. BREDER, C. M. Jr. (*New York Aquarium*), and E. B. GRESSER (*New York U.*). Behavior of Mexican cave Characins in reference to light and cave entry. *Anat. Rec.* 81(4): suppl. 112. 1941.—An abstract.

11647. CUSHING, J. E. Jr. (*California Inst. Tech., Pasadena.*) An experiment on olfactory conditioning in *Drosophila guttifera*. *Proc. Nation. Acad. Sci. U. S. A.* 27(11): 496-499. 1941.—When larvae of this fungus-inhabiting species are reared on laboratory media, the adults show a preference for the laboratory medium for egg-laying.—*R. A. Muttkowski*.

11648. GRETHER, W. F. (*Yale U.*) The magnitude of simultaneous color contrast and simultaneous brightness contrast for chimpanzee and man. *Jour. Exp. Psychol.* 30(1): 69-83. 4 fig. 1942.—On an apparatus of special design 3 chimpanzees were trained to obtain food rewards by pushing against either one of two 3-inch square stimulus areas, each within a separate background. The backgrounds and stimulus areas could be varied independently in color, brightness, and saturation. After they had been given suitable preparatory training on discrimination of fine color differences, the chimpanzees were tested with identical gray stimuli on red and green (contrast producing) backgrounds. The choices of the animals clearly demonstrated the influence of simultaneous color contrast. The magnitude of this effect was measured by finding the quantity of added color required in the stimuli to neutralize the contrast. In a 2d expt., using brightness instead of color differences, simultaneous brightness contrast was studied in a similar manner. These contrast effects were found to be highly similar in magnitude for chimpanzees and human beings. These data lend support to the belief that simultaneous contrast is mediated at a relatively low level in the optic system.—*W. F. Grether*.

11649. GUHL, A. M. (*U. Chicago.*) The frequency of matings in relation to social position in small flocks of White Leghorns. *Anat. Rec.* 81(4): suppl. 113. 1941.—An abstract.

11650. GUHL, A. M. (*U. Chicago.*) Social discrimination in small flocks of White Leghorns. *Anat. Rec.* 81(4): suppl. 114. 1941.—An abstract.

11651. HOYT, A. MARIA. *Toto and I.* A gorilla in the family. [Introduction by ROGER CONANT.] xxv + 238p. Frontispiece, map, 35 fig. J. B. Lippincott Co.: Philadelphia, 1941, Pr. \$2.50.—This is the life story of an anthropoid debutante as member of the family of the author, from her capture in French Equatorial Africa as a 9-lb. babe up to her 9th year and a wt. of 438 lbs. It is an intimate account by an untrained but sympathetic observer of the afflictions, emotions, jealousies, intelligence, and sly tricks of a ♀ gorilla brought up in a human family. She is remarkably affectionate even to her favorite kitten, but has her antipathies, especially to photographers. She has no self-discipline, but is cleanly in her habits. For a few days at the time of new moon she is sensitive and unruly. She shows an instinctive fear of snakes. She loves to hear

watches tick but exhibits nothing indicating that she has a sense of time. The book portrays an ape remarkably human in capacity to learn, in range of emotions, in affection, memory, cupidity, and momentary planning, but hardly in ratiocination at the human level. Readers of Toto's story can not escape the conviction that the apes have remarkable affinities to man.—*C. A. Kofoid*.

11652. PARMENTER, R. The influence of degrees of freedom upon stereotyped conditioned motor reflexes in the sheep. *Jour. Gen. Psychol.* 23: 47-54. 1940.—A castrated ram, which had effected and maintained the bell (unreinforced) and buzzer (reinforced by shock) differentiation and gave a very precise conditioned motor response in a restricted situation, was given relative freedom in the paddock. Stimuli could still be given and the response recorded. “The predictability of response, its episodic character, and its stereotyped form . . . disappeared completely when the animal was moved from the habitual environment of the Pavlov frame and was given considerable liberty of locomotion. Walking or running, in some cases, supplanted the usual precise flexion of the reaction limb when the reinforced conditioned signal was presented. During other presentations of this signal, the conditioned motor response was suppressed.” Protocols and kymograph recordings are presented.—*C. N. Cofer (in Psychol. Abst.)*.

11653. SCOTT, J. P. (*Wabash Coll.*) Genetic differences in the social behavior of inbred strains of mice. *Jour. Heredity* 33(1): 11-15. 1 fig. 1942.—The fighting behavior of ♂♂ of several inbred stocks of house mice belonging to the Jackson Laboratory was studied, and indications of genetic differences were found between all except certain closely related strains. The C57 blacks (subline 10) and C3H agouti strains showed wide differences, little variability, and no overlap in both home and neutral pens. Their basic characteristics appear to be: C57—high degree of activity, tendency to make close contact with physical environment and other mice, and, under certain conditions, pacific behavior; C3H—moderate activity, tendency to avoid close contacts, easily evoked hair-fluffing. They were fought against C (Bagg) albino ♂♂, a moderately active and aggressive type with no extreme traits. Mice are widely different from man in social behavior, but these strains are well adapted for certain special problems of bio-sociology.—*J. P. Scott*.

11654. SEWARD, J. P., and G. H. SEWARD. Studies on the reproductive activities of the guinea pig. IV. A comparison of sex drive in males and females. *Jour. Genetic Psychol.* 57: 429-440. 1940.—Using 2 forms of hurdle box, 14 ♂ guinea pigs were tested after sexual satiation (5 min. of inactivity in the same cage with a receptive ♀) and after several days' deprivation. 17 ♀♀ were tested during oestrus and dioestrus. ♂♂ crossed more quickly and more often after deprivation than after satiation, but ♀♀ did not cross more readily in oestrus than in dioestrus. The implications of the data are discussed.—*D. K. Spelt (in Psychol. Abst.)*.

11655. WARDEN, C. J., H. A. FJELD, and A. M. KOCH. Imitative behavior in *cebus* and *rhesus* monkeys. *Jour. Genetic Psychol.* 56: 311-322. 1940.—Using Warden's duplicate cage technique, 3 *cebus* and 3 *rhesus* monkeys were

tested for imitation in 6 trials on each of 4 problems: (1) pulling a chain to open a door, (2) opening a door by manipulation of a knob, (3) operating a latch and opening a door, and (4) operating 2 latches and opening a door. A raisin was secured every time the door was opened. Each animal showed immediate imitation on the first trial of at least 1 problem; 1 rhesus monkey imitated immediately on the first trial of every problem. Of 144 trials, 76.4% were cases of immediate imitation, the rest showing varying degrees of partial imitation. Tables show the kind of response and time required for each animal on each trial.—*D. K. Spelt (in Psychol. Abst.).*

11656. WIGGLESWORTH, V. B. (*London Sch. Hyg. and Trop. Med.*) The sensory physiology of the human louse *Pediculus humanus corporis* De Geer (Anoplura). *Parasitology* 33(1): 67-109. 33 fig. 1941.—Expts. were done in an arena divided into 2 halves.—A temp. of 29-30°C is preferred before 32°C or 27°C. As the alternative temp. rises above 32°C or falls below 27°C the avoidance becomes increasingly strong. Different individuals vary in sensitivity. These results are in accordance with those observed in a linear gradient of temp., in which the lice collect chiefly in the region from 28 to 31°C. The response is always to air temp.; there is no response to radiant heat from objects at 20-45°C. The louse is generally indifferent to humidity over the range from 10 to 75% relative humidity. Higher humidities are avoided. But when offered 2 humidities the choice is greatly influenced by the conditions experienced by the louse in the immediate past; it avoids any change; hence different individuals may show quite different responses. Moreover, when offered the choice of very moist air (95% rel. humidity or over) and very dry (47% rel. humidity or under) the louse becomes more readily adapted to the moist air and begins to avoid the dry. The louse prefers cloth that has been in contact with human skin to clean cloth or cloth smelling of dog or rabbit. The smell of other lice and of their excreta is also attractive. Many substances serve as repellents; a refined petroleum with a very faint odor has been chiefly used for the expts. When offered smooth and rough materials the louse chooses the latter. It moves more rapidly on smooth materials and does not come to rest so readily. It shows little response to air currents unless very strong, when they are avoided. The movements of the louse are arrested or retarded by sudden exposure to a bright light, and sometimes it may show avoiding movements. But the movement of the louse towards dark places is mainly a response to directed light received by the horizontally

placed eyes. Slight differences in the light received from different directions exert a much greater effect if the louse is exposed to a low level of general light intensity. The movement of the louse towards small dark objects is probably a manifestation of the same response.—The antenna bears 3 types of sensillum: tactile hairs on all segments, peg organs at the tip of the 5th segment (these are shown to be olfactory receptors), and tuft organs on the 4th and 5th segments (these are shown to be humidity receptors). There are also a Johnston's organ and chordotonal organs in the 2d antennal segment. Tactile hairs occur around the mouth parts, and on the legs, etc.; chordotonal organs in the femur, tibia and tarsus of each leg; and there is a group of 5 campaniform organs on the lower surface of each trochanter. The eyes are described. The temp. sense is widely distributed over the body; orientation to high or low temps. still occurs after removal of the antenna and the anterior half of the head, although the sensitivity is reduced.—The mechanism of orientation to the diffuse stimuli of temp., humidity, smell and contact is the same. It consists in an increase in random turning movements upon entering a zone of adverse stimulation (phototaxis or klinokinesis). This may result in an immediate return to the favorable zone if the response is strong and immediate, or in a long convoluted course in the unfavorable zone if the response is weak or delayed. Sensory adaptation is very important in this response. For the increased rate of turning disappears after prolonged exposure to the unfavorable stimulus and only appears again after a favorable stimulus has been experienced. There is no evidence that the louse is "attracted" by a favorable stimulus; it shows only an avoidance of zones where a "repellent" is present or where a favorable stimulus (recently experienced) is absent. Where there is a steep gradient between the adverse and favorable zones the louse may show a directed orientation. This appears to be brought about by a comparison of successive stimulation to right and left by swinging the body and antennae from side to side (klinotaxis). There is no evidence that the comparison of simultaneous stimulation in the antennae (tropotaxis) plays any part. In orientation towards darkness, increased turning in a bright light (klinokinesis) plays a small part. The comparison of stimulation by horizontal light received in the 2 eyes (tropotaxis) is far more important. If one eye is covered the louse makes circus movements towards this side. The relation of these responses to the biology of the louse is discussed.—*From auth. summ.*

ECOLOGY

Editors

ORLANDO PARK, *General Animal Ecology*G. D. FULLER, *General Plant Ecology*CHANCEY JUDAY, *Hydrobiology (Oceanography, Limnology)*FREDERICK A. DAVIDSON, *Ecology of Wildlife Management—Aquatic*
W. L. McATEE, *Ecology of Wildlife Management—Terrestrial*ROBERT G. STONE, *Bioclimatology, Biometeorology*

(Other entries in this issue: [GENERAL AND ANIMAL ECOLOGY]—Adapt. of *Drosophila* to artificial media, 11647; Temp.-humidity preferences of body louse, 11656; Temp. preferendum of insects, 11660; Temp., food supply and age as affecting growth of Calif. mussel, 11728; Temp. and humidity as affecting life hist. of spider, 13748; Vinegar eels, 12965; Response of insects to color, intensity, and distr. of light, 13479; Insect abundance, Kansas, 1940, 13482; Carpet beetles, 13505; *Gambusia* feeding on mosquito larvae, 13518; Anopheline larvae development in various aquatic plant communities, India, 13521; Respiratory adaptations in parasitic dies, 13537; Paleoclimatol. of N. China, 13561; Paleocology of Eocene, Calif., 13563; Population problems in Protozoa, 13624; Coral, 13625, 13626, 13627; Growth-rate of trop. coral, 13632; Physiol. of larval Strongylids, 13667; Size of starfish, 13696; Copepod parasite of fish, 13711; Ecuador, 13722; Cuticle color in insects, 13725; Beetle depredator of bee nests, 13771; Mosquito breeding in water-holding flower, 13789; Chironomid larvae, 13797; Breeding of *Anopheles*, 13799; Biotic zones, Argentina, 13810; Moth-ant association, 13840; Fulmar (Aves) in British Isles, 13976. [PLANT ECOLOGY]—Agriculture in Argentina, 11517; Guatemala, 11518; Ecospecies in Tertiary Paleobotany, 11551; Tree-ring analysis, 11664; Soil fungi, 12986; Soil management and rainfall run-off, 13246; Soil temp. as affecting root growth colonial bent grass, 13384; Pollination in orchid, 13080; Orchids of Lake Superior region, 13088; Factors controlling development of endodermis, monocots, 13161; Tyloses in oak spp., 13162; Plants indicative of air-supplying power of moor soils, 13199; Floating habit of rice, 13222; Selenium toxicity and seleniferous soils, 13230; Contouring and soil erosion, Iowa, 13252; Erosion control, 13254; Reproduction in *Cunninghamia*, 13324; Reclamation of drift sands, S. Africa, 13333; Forests of Iowa, 13334; Mycorrhizas and spruce in N. Zealand, 13339; Forests of Belgian Congo, 13350; Gregarious flowering in *Zephyranthes*, 13377)

GENERAL

11657. CARPENTER, J. RICHARD. (*Black Mountain Coll., N. Carolina.*) The biotic community as an object of study. *Chron. Bot.* 6(17/18): 386-388. 1941.—Recommends biotic studies rather than plant or animal ecology and gives illustration of aspectation, succession, and erosion studies from his own work and that of others.—*L. J. Gier.*

11658. KALSHOVEN, L. G. E. Invloed van de locale macroscopische fauna, en met name van de termieten, op de vruchtbaarheid van den bodem. [Influence of local macroscopic fauna, especially termites, on soil fertility.] *Tectona* 34(8/9): 568-580. 2 pl. 1941.—A discussion of the effect of soil fauna on the physical condition and fertility of the soil, largely based on the findings of other investigators.—*W. N. Sparhawk.*

11659. SKOTTSBERG, CARL. (*Göteborgs Botaniska Trädgård.*) The Falkland Islands. *Chron. Bot.* 7(1): 23-26. 1942.—Geography, geology, and an ecological treatment of the subject. The vegetation originated from the old Antarctic flora or from the Andean; there are no trees, and few native shrubs, geophytes, and annuals. "Scientifically, the Falkland Islands are important as one of the richest refuges of the Subantarctic flora, and fortunately there seems to be little possibility to 'develop' them."—*L. J. Gier.*

BIOCLIMATOLOGY, BIOMETEOR-
OLOGY

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11660. DEAL, JOHN. (*Rothamsted Exp. Sta.*) The temperature preferendum of certain insects. *Jour. Animal Ecol.* 10(2): 323-356. 1 pl., 10 fig. 1941.—A description is given of 3 different types of apparatus experimented with before selecting a linear brass gradient which gave a range of temp. from 10° to 35°C. in a straight line gradient. This allowed the insects a choice of about 1°C. in every 4 cm: The relative humidity in such an apparatus varied inversely with the temp. except where food was used, when it remained practically uniform. The temp. preferendum was tested of 23 species of insects from 6 orders. Insects were chosen to

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represent different environments or habitats, such as the following: stored product insects, leaf-feeding insects, plant-sucking insects, human parasites, insect parasites, and soil insects. Results are based on expts. each carried out for not less than 3 days. In every case a control was also run for 1 day to get the random distribution of the insects. At the cold end of the gradient the metabolic activities of the insects were slowed down to such an extent that many species were trapped there, thus giving an apparent preference for the colder end. As a result when insects went to a warmer zone it was considered more significant than when they went to a cold zone. The flour beetle (*Tribolium confusum*) when kept at 27°C. had a lower preferred temp. than when kept at room temp. Wireworms kept at 5°C. for a fortnight gave no different reaction from those kept at room temp. Insects that were given food in the gradient had a narrower preference zone than when not given food. In general the preferences of the immature forms tended to coincide with those of the adults of the same species. With saw-flies (*Pteronides melanaspis*) the ♂ tended to have a wider temperature range than did the ♀. The braconid parasites (*Apanteles congestus*) went to a lower temp. on each successive day they were in the gradient and at the end of 3 days were alive and quite active. At the same time a surplus stock kept at room temp. were all dead at the end of 1½ days. Generally speaking, all the insects experimented with have shown a definite temp. preference—but the preference has been for a fairly wide range of temp. and not a point—as has been suggested by some workers.—Auth. summ.

11661. HAMRICK, ANDREW M., and HOWARD H. MARTIN. Fifty years' weather in Kansas City, Mo., 1889-1938. *Monthly Weather Rev.* Suppl. No. 45. iii+53p. 1941.—A very useful compilation of climatic data for this station. Includes a number of tables of types not ordinarily found in routine climatic summaries.—R. G. Stone.

11662. KALAMKAR, R. J., and V. Satakapan. The influence of rainfall distribution on cotton yields at the government experimental farms at Akola and Jalgaon. *Indian Jour. Agric. Sci.* 10(6): 960-974. 3 fig. 1940.—A statistical study was made of the correlation of rainfall with yields of cotton for 1907-36 at Akola and for 1913-36 at Jalgaon. The multiple correlation coefficients were 0.58 and 0.56 respectively for the 2 locations, indicating that the significance of the rainfall effect is not definitely established by these data.—C. H. Arndt.

11663. PETTERSSEN, SVERRE. Introduction to meteorology. ix+236p. 142 fig. McGraw-Hill Book Co.: New York, 1941.—This book is intended as an elementary introduction to general meteorology, for students without previous knowledge of the subject. No mathematics beyond an occasional simple algebraic formula is used; and the elementary physics involved is explained in the text. The emphasis is on synoptic and aeronautical meteorology; but nearly all the more important topics of meteorology proper (i.e., exclusive of optical, electrical, and acoustic phenomena of the atmosphere) are at least briefly discussed. The opening chapters describe the general nature and structure of the atmosphere, and the principal types of meteorological observations and instruments. A chapter is then devoted to evaporation, condensation, and precipitation, followed by 2 chapters on adiabatic processes in the atmosphere and atmospheric stability. The next chapter discusses the processes by which transfers of heat and changes of temp. are brought about in the atmosphere, and some of their effects—including modification of lapse rates, occurrence of convection, thunderstorms, fog formation, and ice accretion on airplanes. A chapter on atmospheric circulation—winds, their relation to pressure distribution and their variation with height; the planetary circulation; turbulence; etc.—is followed by 2 chapters on air masses and fronts, and a chapter on cyclones (extratropical and tropical) and anticyclones, with a brief allusion to tornadoes and waterspouts. The next 3 chapters are devoted to the drawing and analysis of synoptic maps, and the forecasting of weather, in accordance with the most recent methods, illustrated by actual examples. The book concludes with a chapter on climate and the climates of the earth, and one on the history of meteorology. A list of recommended books for further reading, a few short tables, and an index are appended.—Courtesy U. S. *Monthly Weather Rev.*

11664. SCHULMAN, EDMUND. Precipitation records in California tree rings. *Proc. Sixth Pacific Sci. Congr.* 3: 707-717. 1939(1940).—Two basic principles of precise tree-ring analysis are (1) the possible selection of trees so that some growth-limiting variable (e.g., water supply directly from precipitation in the temperate zone and desert regions) is more or less isolated in the ring record, all the other variable forces operating on the tree being at a minimum; and (2) good cross-dating within a group of concurrent ring records from trees in the same local climatic area. Cross-dating varies in quality as a direct function of av. percentual change in ring width from yr. to yr., and av. deviation in relative width of any ring from the group mean for that yr.; thus good cross-dating and a significant climatic record are present when easily recognized patterns of thick and thin rings can be found at various places in any ring sequence and in most or all specimens of the group. Erroneous conclusions in previous investigation into the relationship of Monterey pines to seasonal rainfall arose in part because the preceding 2 principles were not sufficiently considered. By cross-dating, all false rings in Monterey pine can be correctly identified with respect to date. False annual rings in Monterey pine are of 2 types: with hazy outside boundary (the normal false ring in pine), and with sharp annual-like outside boundary. Sharp extra rings are traced to unusually heavy Sept. or Oct. rains, which occurred in 1889, 1899, 1904, 1907, and 1918. The effect of 50 yrs. of irrigation on 2 trees illustrates changes in the type of record, from a good rainfall-ring chronology to one in which the climatic response is submerged by the "random" term in radial tree growth. Growth curves representing various groups of Monterey pine are extremely similar (high cross dating); the correlation coefficient of the mean curve with seasonal rainfall at Monterey is 0.77 ± 0.04 . The Monterey pine chronology provides a rainfall index extending back to 1821, and with poorer quality to 1787, which supplements the index, based on records of crop yields, floods, etc., compiled by H. B. LYNCH. A 2-yr. cycle with a change of phase or strength at approx. 23-yr. intervals is a pronounced feature in the last 115 yrs. of Monterey pine growth. Tree-ring groups from widely scattered sites in northeastern California show essentially the same chronology, with about 10 outstandingly thin rings in the last century consistently present in all groups. A network of selected tree-ring groups makes available data throughout several centuries on the fluctuating limits of the areas of great excess or deficit in precipitation in the California region. Various spp., such as ponderosa and Jeffrey pine, sugar pine, western juniper, Monterey pine, and Coulter pine, show a substantial general agreement in chronology which is believed to be related to the pronounced summer drought in California. The agreement of the sequoia chronology of Douglass with the recently collected groups, especially in drought yrs., emphasizes again the importance to climatologists of this 3200-yr. sequence.—Auth. summ.

11665. VISHER, STEPHEN S. (U. Indiana.) Weather influences on crop yields. *Econ. Geogr.* 16(4): 437-441. 4 fig. 1940.—Data used in this analysis consist of Indiana yields from 1887 to 1939 inclusive and monthly average temp. and rainfall totals, the number of days with temp. above 90°, minimum temp., length of growing season, etc. The evidence presented by isopleth climographs of groups of months is summarized. The isopleth climograph is a shaded diagram made by plotting 2 weather factors, one on the abscissa and the other on the ordinate. At the meeting point of the perpendiculars erected from these points the crop yields for the following harvest are plotted, isopleths are drawn connecting equal yields, and the zones shaded. A summary of the diagrams for corn revealed the following conditions favorable for best corn yields in Indiana: a warm April, May and June wetter and warmer than average, July and August with above-average temp. and average or above-av. rainfall, and Sept. av. in temp. and rainfall. The climographs for wheat showed as desirable: dry Februaries, Marches warmer than usual, cool Aprils with somewhat less than average rainfall, wet cool Mays, and at least 18 inches of snow in winter. For large oats yields the following are favorable: cool weather from April through July with more than normal rainfall in May and June; and for hay, the following: above-average temp.

in March and April, heavy rainfall in May, cool wet Junes, and Julys wetter and less hot than normal.—*N. E. Zink.*

11666. WEIGHTMAN, RICHARD HANSON. (*Weather Bur., Washington.*) Preliminary studies in seasonal weather forecasting. *Monthly Weather Rev.* Suppl. No. 45. viii + 99p. 291 maps. 1941.—An attempt to find some basis for long-range forecasts for U. S. by the method of world-wide correlations used by Walker for forecasting monsoon rain in India. By making large numbers of correlations of U. S. temp. and rainfall data with those for places scattered over the globe, using various logs, it was hoped to find some relatively high coefficients which could be selected and tested further for combining into a forecasting equation. The coefficients found are here published but no attempt has yet been made to weld them into multiple correlations; the promising coefficients are pointed out and further lines of investigation suggested. The Pacific and Atlantic oscillations of Walker are shown to affect the United States and might serve as basis for forecasts. There is a useful review of various approaches to long-range forecasting and an extensive bibliography.—*R. G. Stone.*

ANIMAL

11667. ALLEE, W. C. (*U. Chicago.*) Integration of problems concerning protozoan populations with those of general biology. *Amer. Nat.* 75(760): 473-487. 1941.—This paper, a summarizing discussion of a symposium on protozoan populations, discusses problems raised by a study of such populations in connection with general knowledge of the mechanics of the control of population size in insects and other animals as well as in Protozoa. Following the entomologists, density-independent and density-dependent control factors are recognized and the latter are seen to consist of direct and inverse density-dependent factors. Such direct factors take a larger % toll the greater the population while inverse density-dependent factors take a higher % toll the smaller the population. Population problems are discussed in connection with a simplified version of Clements and Shelford's ecological action system. The conclusion is reached that survival values in population physiology present an essential dichotomy into beneficial (cooperative) and harmful (disoperative) effects. Competition may be either beneficial or harmful, depending in part on criteria of value. From the existence of under-crowding, as contrasted with over-crowding, and the resulting optimum population of some intermediate size, it is argued that there is a tendency toward non-conscious cooperation which is a basic and wide-spread phenomenon. Among other implications, this suggests that the population is a unit upon which natural selection can act to bring about the higher phases of social living. Still more general implications are suggested.—*W. C. Allee.*

11668. BRAGG, ARTHUR N., and CHARLES CLINTON SMITH. (*U. Oklahoma.*) The ecological distribution of toads of the genus *Bufo* in Oklahoma. *Anat. Rec.* 81(4): suppl. 70-71. 1941.—An abstract.

11669. CAPRARO, V. [Energy metabolism of *Carcinus moenas* in relation to osmotic pressure and temperature of environment.] *Boll. Soc. Ital. Biol. Sper.* 15: 339-340. 1940.—The increase in O consumption (from 95 to 145 at 24.5° and from 23 to 33 cc. per kg. per hr. at 10°) on transferring the animal from normal to dil. (50%) sea water is not due to the increase in osmotic energy demands on the organism.—*Courtesy Chem. Abst.*

11670. CARPENTER, J. RICHARD. (*Black Mountain Coll.*) The physiological life history: a biotic concept in autecology. *Anat. Rec.* 81(4): suppl. 113. 1941.—An abstract.

11671. CHITTY, DENNIS, and HELEN CHITTY. (*Oxford.*) Canadian Arctic wild life enquiry, 1939-40. *Jour. Animal Ecol.* 10(2): 184-203. 1 pl., 5 fig. 1941.—85 replies to questionnaires give data on changes in number of lemmings (*Lemmus* and *Dicrostonyx*), Arctic fox (*Alopex lagopus*), and snowy owls (*Nyctea nyctea*). In general there was comparative scarcity after recent decreases in numbers. There were striking regional differences in population changes. For lemmings and "mice" a peak year came in 1938-39 in Southampton Island, Repulse Bay, and Chesterfield Inlet. In 1936-37 a peak occurred at Tavane, Nonala, and Eskimo Point; in 1937-38 at Northern Quebec, Baffin Island, Fort Ross, King William Island, and Cambridge

Bay; and in 1938-39 in Northern Labrador and West Coast Victoria Island. In the first of these regions another peak may have occurred in 1939-40 after a 4-yr. interval. Arctic foxes and snowy owls tend to show a rise and fall in population in harmony with the lemming cycle. The severe 1938-39 pandemic of dog disease was apparently checked by quarantine measures at Pond Inlet during 1939 and did not spread far beyond its previous limits here and at Repulse Bay.—*S. C. Kendal.*

11672. CRAUFURD-BENSON, H. J. (*Cooper Tech. Bur., Berkhamsted.*) The cattle lice of Great Britain. Part II. Lice populations. *Parasitology* 33(3): 343-358. 1941.—The seasonal variations and regional distribution of the cattle lice were studied by monthly examinations of cattle at the Cooper Field Res. Sta. Additional evidence has been obtained by the distribution of a questionnaire to farmers, the general results of which are included in this paper. The seasonal variations of the populations of the 4 spp. of cattle lice in Great Britain are similar. The max. population density is reached in Feb. and Mar. In Apr. and May there is a rapid decline until the populations reach their lowest level in June, July and Aug. In Sept., the lice start increasing in numbers. The regional distribution of the population varies in accordance with the seasonal variations of the whole population. The various climatic factors that may affect the lice populations are discussed. Light intensity is probably a factor of major importance in Britain. The various factors inherent in the host animal are discussed, and it is suggested that the seasonal fluctuations of the density of the animal's coat are important. The finding of a previous paper (1941) that the micro-climatic temp. is important as affecting the hatching of eggs is discussed in relation to the variations of lice populations as a whole.—*Auth. summ.*

11673. HALL, RICHARD P. (*New York U.*) Populations of plant-like flagellates. *Amer. Nat.* 75(760): 419-437. 1941.—Laboratory cultures undergo changes which become increasingly detrimental to growth as the population increases in density, although the effects may be postponed by occurrence of a lag phase when biol. conditioning exerts a favorable action. The growth-rate, in young cultures, may be influenced by a variety of factors, including the initial density of population. The allelocatalytic effect has been reported in *Chilomonas paramecium* and, under certain conditions only, in *Euglena gracilis*. This evidence is evaluated in relation to technique of inoculation. The Woodruff effect also has been reported in *Euglena* and *Chilomonas*. The concept of an "X substance," supposed to be produced by *Chilomonas* and to exert quantitative effects on growth, is based upon inconclusive evidence. Most of the basic factors influencing growth of plant-like flagellates remain to be investigated in detail.—*R. P. Hall.*

11674. HALL, R. P., and A. SHOTTENFELD. (*New York U.*) Maximal density and phases of death in populations of *Glaucoma piriformis*. *Physiol. Zool.* 14(3): 384-393. 1941.—Population growth in pure cultures of *G. piriformis* has been traced through the phase of maximal density into the later "phases of death." Growth was observed in 2 different casein-peptone media and in media containing a mixture of the 2 peptones. The maximal density of population differed for the 2 peptones, and showed an intermediate magnitude in a mixture of these peptones. Constituents of the medium primarily responsible for the higher densities of population apparently are exhausted during growth of the ciliates. Phases in the decline of populations from the point of maximal density are described. Living ciliates were still present in cultures after 3-8.5 months of incubation.—*R. P. Hall.*

11675. HIRO, F. (*Seto Mar. Biol. Lab., Wakayama-ken.*) On the barnacle communities at the Madarai Pier in Koror Island, Palao. *Palao Trop. Biol. Sta. Stud. [Tokyo]* 1(4): 585-595. 5 fig. 1939.—On the west wall of the middle waterway under the pier *Chthamalus witheri*, *Tetraclita squamosa viridis*, *T. vitigata*, and *T. coeruleescens* were more abundant than on the east, where the current impinged. *C. witheri* was more abundant medially, where current action and light were least; the others showed approx. uniform lateral dispersion. Each sp. had a vertical range of about 90 cm., with upper limits respectively the surface at high tide and 30, 50, and 60 cm. below that level. Size and vertical

range differed in other habitats. General upward orientation of the carina, also found for *Balanus amphitrite communis* on vertical slate plates in Tanabe Bay, is thought to indicate negative geotropism. Near the edges of the wall this orientation of *Tetraclita* spp. was shifted toward the light. The inversion or partial rotation of many at the bottom of the wall is correlated with the strong low tide current. Gravity, light, current action, and facilities for food-capture are believed to effect the orientation of the adult.—L. W. Hutchins.

11676. JOHNSON, WILLIS H. (Stanford U.) Populations of ciliates. *Amer. Nat.* 75(760): 488-457. 1941.—The literature on populations of ciliates is reviewed with particular reference to those investigations bearing on the effects of metabolic products, the effects of numbers of organisms and the effects of the food supply on such populations. Whereas many workers have concluded that metabolic products which accumulate in the medium check growth in the early stages of a population, recent studies indicate that some of the effects which have been ascribed to metabolic products may be due to a depletion of the food supply, or of certain food accessories. A history of the "Robertson effect" is presented. A biological conditioning of some kind is evident in certain studies. The question of whether a growth substance is produced by ciliates is not yet answered. Stages in the progress of controlling the food supply in such population studies are outlined. Recent investigations point to the extension of the pure culture method in ciliate studies and to a more precise control of the basic food materials, and the vitamins and food accessories as well.—W. H. Johnson.

11677. MACAN, T. T. (Freshwater Biol. Assoc., Ambleside), and A. MacFADYEN (Oxford U.). The water bugs of dewponds. *Jour. Animal Ecol.* 10(2): 175-183. 1 pl., 1 fig. 1941.—English dewponds are small shallow isolated watering pools for domestic stock with waterproof bottoms and normal absence of inflow and outflow. The ponds may either be fenced or the stock may wade through and pollute them considerably. The water is often very fertile and calcareous. Collections were made from 50 of these dewponds by means of a handnet. The relative abundance of various spp. of Corixidae and Notonectidae are compared. Four spp. of Corixidae—*Sigara lateralis*, *S. nigrolineata*, *Corixa punctata*, and *S. limitata*—were common, and a total of 26 spp. of Heteroptera was recorded. Large numbers of Corixidae were found in the polluted ponds while in other ponds the number of bugs tended to decrease as the density of vegetation increased. Habitat conditions most favorable for various species are analyzed. Most of the spp. are rare in other regions where the water is non-calcareous.—S. C. Kendal.

11678. ROGICK, MARY D. (Coll. New Rochelle, N. Y.) The resistance of fresh-water Bryozoa to desiccation. *Biodynamica* 3(77): 369-378. 5 fig. 1941.—It follows from the literature reviewed that the longevity of dry Bryozoa statoblasts varies with the species. Some statoblasts germinate after several years in the dry state (the longest record is 50 months for *Lophopodella carteri*), but they die when kept dry for longer times (74 months for this sp.). Dry statoblasts probably maintain their viability better when kept at about 10°C than at room temp. Relationships between length of time in the dry state and (1) time necessary for hatching or for development, and (2) longevity of colonies derived from dry statoblasts, are discussed.—Basile Luyet.

11679. TALIAFERRO, WILLIAM H. (U. Chicago.) Populations of blood-dwelling species. *Amer. Nat.* 75(760): 458-472. 1941.—An analysis is made of the environmental conditions (natural and acquired immunity of the host) which influence populations of parasitic protozoa in the blood of single hosts. The factors which inhibit the reproduction of the parasites are differentiated from those which kill them. The question of a natural immunity against the pathogenic trypanosomes has not been studied in the mouse, but no acquired immunity is developed. In malaria, even under the best conditions, i.e., in a highly susceptible host before the onset of acquired immunity, the host is far from an ideal medium because the great majority of the parasites perish (innate or natural immunity). In both malaria and infections with the pathogenic trypanosomes in the guinea pig, the parasites maintain a high rate of reproduction,

but periodically large numbers of them are killed by parasiticidal factors of acquired immunity. In malaria, these parasiticidal factors, i.e., opsonins and phagocytes, may keep the numbers of an actively reproducing population at a low level over a long period (developed infection and probably latency), but may be temporarily removed and, thus, allow the parasites to reaccumulate (relapse). In infections with the pathogenic trypanosomes, the parasiticidal factors, i.e., lysins which produce each decrease in parasites, remain in the host, but the parasites, because they possess the ability to become hereditarily resistant to them, can reaccumulate in the presence of lysins which were fatal to their original progenitors. In infections of *T. lewisi* in the rat and related trypanosomiasis, the host, in addition to developing parasiticidal antibodies, forms an antibody, i.e., ablastin, which completely inhibits the reproduction of the parasite. Therefore, even when the trypanosomes become adapted to the parasiticidal mechanisms of the host, there can be no relapse because the reproduction-inhibiting antibody is still operative.—W. H. Taliaferro.

11680. UNGER, W. BYERS. (Dartmouth Coll.) Differential effect of a sodium salt of an aryl-alkyl-sulfonate upon small animals in a mixed culture. *Anat. Rec.* 81(4): suppl. 129. 1941.—An abstract.

11681. WALOFF, NADEJDA. (Birkbeck Coll., U. London.) The mechanisms of humidity reactions of terrestrial isopods. *Jour. Exp. Biol.* 18(2): 115-135. 8 fig. 1941.—Woodlice, *Porcellio scaber*, did not orient themselves to slow air currents in a tube. Thigmokinesis (% of time spent next to glass wall) increased from 79-82% at 20-55% R.H. (rel. humidity, controlled with H_2SO_4 -H₂O mixtures) to 92.6% at 90-95% R.H. As studied in a modified Gunn's (1937) circular glass humidity apparatus at various constant R.H.'s, there was decrease in speed and activity (hygrokinesis) in *Oniscus asellus*, *Porcellio scaber* and *Armadillidium vulgare* from 45-65% R.H. upward. Periods of rest increased at high humidities with *Oniscus* and *Porcellio*, but less and not beyond 60% R.H. with *Armadillidium*. Turnings (90° = 1 unit) decreased from 75% R.H. in *Oniscus*, consistently in *Porcellio*, and indefinitely from 90% in *Armadillidium*. Distance between turnings decreased rapidly from 70-75% R.H. in *Oniscus*, less rapidly from 60-65% in *Porcellio*, and less rapidly to a higher value, from 40-45%, in *Armadillidium*. In humidity gradients, *Porcellio* spent more time in the damp half, where speed was less and periods of rest greater. In 75-95%, 65-85%, and 55-75% gradients, distance and time between turns were less in the damp half; in 20-73% and 42-60% gradients they were greater. *Oniscus* survived least well, *Armadillidium* best to desiccation at various R.H.'s. *Oniscus'* rate of water loss was 9.9%, 6.3% and 3.6% of body weight per hr. in R.H. of 0%, 50% and 75%, respectively. It was progressive with time. In a gradient of 50-90% R.H. dry half darkened, majority tended initially toward the dark dry half, but eventually settled in the light damp half. Thus, *Oniscus*, *Porcellio* and *Armadillidium* range from moist to least moist natural habitat, and from least to greatest resistance to desiccation. Humidity reactions with correlated thigmokinesis, and negative phototaxis (except at very low humidities) combine to retain the animals in damp, dark habitats.—C. V. Winder.

11682. WILSON, FRANCIS H. (Tulane U.) Age, maturity and growth in a population of *Amphiuma tridactylum*. *Anat. Rec.* 81(4): suppl. 63. 1941.—An abstract.

11683. YAMANOUTI, T. (Kyoto Imp. U.) Ecological and physiological studies on the Holothurians in the coral reef of Palau Islands. *Palau Trop. Biol. Sta. Stud. (Tokyo)* 1(4): 603-635. 4 fig. 1939.—Sieve analyses of oesophageal and rectal contents showed no comminution of coral sand by digestive grinding or dissolution in *Holothuria atra*, *H. edukis*, *H. flavo-maculata*, *H. scabra*, *H. bivittata*, *H. vitiens*, *Stichopus variegatus*, and *S. chloronotus*, though slight dissolution probably occurs. Stomach fluid pH, lowest when the stomach was empty, was 5.6.7. Complete digestive cycles in these spp. and *Caudina chilensis* took 2-5 hrs. naturally, and slightly longer in the laboratory. Daily ingestion by *H. atra* (85.55 g.) and *H. vitiens* (73.04 g.) indicated the 407,400 individuals of these 2 spp. on 798,500 m² of reef-flat work over 12,460 tons/year, or 15.60 K./m². Redistribution of sand is the most important effect on the bottom, in-

dividuals moving as much as 52 meters per day where food is scarce. The first 3 spp. listed feed continuously; the rest, and *H. lecanora* var., are inactive at least $\frac{1}{2}$ of the day. The 2d 3 spp. burrow from before dawn till after noon. This periodicity of *H. vitiens* was maintained in continuous exptl. darkness, and by eviscerated animals, suggesting it is inherent in the central nervous system. *H. flavo-maculata*, *H. lecanora*, and *Synapta* sp. are ooze-feeders; other spp. show some selection of sand size, varying with age. Distr. is limited by food, wave and current action, and bottom decomposition products.—L. W. Hutchins.

PLANT

11684. ALBERTSON, F. W., and J. E. WEAVER. History of the native vegetation of western Kansas during seven years of continuous drought. *Ecol. Monogr.* 12(1): 23-51. 34 fig. 1942.—The prairie vegetation of western Kansas was studied through 7 yrs. of continuous drought, 1933 to 1939, inclusive. Water content of soil was determined weekly during the growing season, and a record of aerial environmental factors obtained. Reactions of the mixed prairie and short grass vegetation were recorded yr. by yr. in scores of permanent, widely distributed quadrats, and by extensive field notes. Moderately grazed and ungrazed prairies were in excellent condition in 1933 because of a very favorable 6-yr. period just preceding when the av. annual precipitation (27.8 in.) was approx. 5 inches above normal. Annual precipitation during each of the drought years was below normal and during 4 of the 7 yrs. nearly 7 in. below. Most of this deficit occurred during the growing season. Periods of 5-7 weeks in summer with practically no rainfall occurred. An accumulated deficit of 6.7 in. in 1933 increased to 21.6 in 1936 and to 34.5 in. in 1939. Temps. were abnormally high during the drought and duration of periods with high temps. unusually long. Wind movement was also unusually high. That of 1934 was greatest, being 41,782 miles from April to Sept., inclusive. The lowest (1936) was 33,838 miles. High wind velocity resulted in dust storms which reached a climax in Mar. and Apr., 1935. Vast areas of vegetation were smothered by thin blankets of silt or by great drifts of loose earth. After the vegetation died, the dust was again moved by the wind and thus supplied the silt for later black blizzards. Water content of soil was detd. at weekly intervals throughout the growing season to a depth of 5 feet. Available water was the limiting factor to plant production. Water was non-available throughout most of the drought period except for short intervals in the upper 6 in. 3 types of vegetation, with varying degrees of intermixtures, are common in the mixed prairie of west-central Kansas. They are the little bluestem (*Andropogon scoparius*) type, common on hillsides and in shallow ravines; the short-grass (*Buchloe-Bouteloua*) type, widely distributed over nearly level uplands; and the big bluestem (*Andropogon furcatus*) type of larger ravines and lower moist slopes. During the 7 yrs. of drought, vegetation remained wilted or dried over periods of several weeks' duration. Periods of dormancy alternated with those of growth several times during a single summer. Many mesic plants disappeared completely and even the most xeric spp. were reduced greatly in numbers. Animal life was also greatly depleted. The original basal cover of about 60% in the little bluestem type was composed of approx. $\frac{1}{6}$ big bluestem and nearly all of the remainder was little bluestem. Little bluestem decreased so rapidly that only 1-4% remained in 1939. Big bluestem was reduced to 2% or less. Invasion of more xeric spp., especially side-oats grama (*Bouteloua curtipendula*) and blue grama (*B. gracilis*), resulted in the minimum basal cover of 16% (1936) being increased to 22-30% in 1939. Studies in the *Buchloe-Bouteloua* type were begun in 1932 and extended in 1935 to include several grazing treatments. In 1937 quadrats were established in pastures in 10 counties of western Kansas; some pastures had undergone various degrees of covering by dust. Moderately grazed pastures with an equal mixture of buffalo grass (*Buchloe dactyloides*) and blue grama grass in almost pure stands had a basal cover of 80-90% when protected from grazing. This decreased slowly until 1936 when it was only 55%, and in 1939 only 22%. Overgrazed short grass ranges were reduced to a cover of 26% in 1936 but gradually increased to 19% in 1939. Intensive studies of ranges were

made in 10 additional counties in western Kansas, beginning in 1937. All were in the short grass type. On lightly dusted and moderately grazed ranges basal cover varied from 10 to 33%. Percentage of buffalo grass usually averaged higher than that of blue grama. Variations in cover were usually closely correlated with the amt. of rainfall. No permanent gains occurred by 1939. Drought, overgrazing, and hordes of grasshoppers have caused great reduction in carrying capacity of the range. Yield of palatable forage in overgrazed pastures is < 10% of that produced in well-managed ones. Where 10-12 acres were formerly required to sustain one animal unit, 30-50 acres are now needed.—Authors.

11685. COOPER, WILLIAM S. (U. Minnesota.) Vegetation of the Prince William Sound region, Alaska; with a brief excursion into post-Pleistocene climatic history. *Ecol. Monogr.* 12(1): 1-22. 1942.—The vegetational climax of the lower altitudes around Prince William Sound is an extension of that of southeastern Alaska, differing in preponderance of *Tsuga mertensiana* and in the abundant presence of "tundra," which comprises 2 types, *Empetrum* heath and *Carex* bog. In those fiords which penetrate deeply into high mountain masses, forest is reduced to small patches, but this and the alder thickets and tundra which largely replace it are of great age. The hypothesis is offered that the "present" (liberally construed) in coastal Alaska is a time of ice expansion on a scale not equalled during many centuries of the past; that there was a preceding period of contraction of a magnitude so great as to be a major, or perhaps the major event of middle post-Pleistocene time; and that the latter corresponds with the warm-dry period proposed by European students, widely accepted in America, and supported by evidence from varied fields of research.—W. S. Cooper.

11687. DAUBENMIRE, R. F. An ecological study of the vegetation of southeastern Washington and adjacent Idaho. *Ecol. Monogr.* 12(1): 53-79. 19 fig. 1942.—That portion of the Columbia Plateau which includes approx. the southeastern quarter of the State of Washington has not been forested since the elevation of the Cascade Mountains during Pleiocene time. With the resultant development of aridity the driest portion of this area became inhabited with desert-like communities of spp. which immigrated chiefly from the south, while in less arid portions of the area there developed the "Palouse" grasslands which contain a high proportion of more or less endemic spp. This modern vegetation may be divided on the basis of climatic climaxes into three zones: the *Artemisia-Agropyron* zone in the western, driest part of the area, the *Agropyron-Poa* zone in the intermediate, less arid region, and the *Festuca-Agropyron* zone along the eastern, most mesic edge of the Plateau. These vegetation zones are closely correlated with major soil series. Most of the detailed vegetational analyses concern the 2 prairie climatic climaxes. The *Agropyron-Poa* association is dominated by grasses of the bunch habit, is vegetatively active in the cool, rainy winter and spring, but remains completely dormant during the hot dry summer. The *Festuca-Agropyron* association is dominated by perennial forbs, is floristically richer than the other prairie, and has a shorter period of aestivation. The principal edaphic, fire, and biotic climaxes of all three zones are briefly described.—R. F. Daubenmire.

11688. GAMS, HELMUT. Über neue Beiträge zur Vegetationssystematik unter besonderer Berücksichtigung des floristischen Systems von Braun-Blanquet. *Bot. Arch. [Leipzig]* 42(2): 201-238. 5 fig. 1941.—A review and discussion.—C. K. Horner.

11689. GURVICH, BERNARDO ROSENGURTT. (Fac. Agron., Montevideo.) La vegetación del Uruguay. *Chron. Bot.* 6(17/18): 410-411. 1941.—Not more than 10% of area is cultivated. Names dominant spp. with some sub-dominants for about a dozen different habitats from the mountain to the shore. Of the 2800 vascular plants listed, 519 spp. are exotic. Gives number of representatives of 22 main families (Compositae 371 spp.) and names the important contributors to the study of their flora.—L. J. Gier.

11690. HODGE, W. H. (Massachusetts State Coll., Amherst.) The vegetation of the Lesser Antilles, a brief review. *Chron. Bot.* 6(17/18): 402-404. 2 maps. 1941.—The major communities, are: coastal and shore vegetation, low xerophytic vegetation, tropical rain-forests of middle elevations,

and mossy forests of highest volcanic peaks. The principal genera of each area are mentioned.—*L. J. Gier.*

11691. JACCARD, PAUL. (*Lab. Pl. Physiol., Zurich.*) *Sur le coefficient générique, II. Chron. Bot.* 6(17/18): 389-391. 1941.—(Concluded from *Chron. Bot.* 6: 361-364.)—A relationship exists between the generic coefficient and the degree of frequency of associated species. This furnishes a valuable tool to the plant sociologist for comparing the floras of limited territories.—*L. J. Gier.*

11692. JONES, CLYDE H. (*Ohio State U.*) *Studies in Ohio floristics. I. Vegetation of Ohio bogs.* *Amer. Midland Nat.* 26(3): 674-689. 4 fig. 1941.—A 10-yr. study has been made of the native vascular plants of Ohio which occur on areas where the soil is constantly moist and contains a high % of organic material which has a "spongy feel" when walked upon or compressed between the hands. These areas have been classified according to their physiography, method of development, and vegetation cover. A genetic study has been made in relation to the plant spp. comprising the various zones of vegetation which come into being during the transitions from an open-water body to a bog. Approx. 50 spp. of Ohio's native vascular plants are confined to bog habitats, and 235 additional spp., of wide habitat range, have been collected in these areas.—*C. H. Jones.*

11693. MARX, DAVID S. *Seed mechanics.* *Sci. Month.* 53(6): 583-584. 1 fig. 1941.—Several examples are cited of seed pods in which the development of mechanical tension assists in the distr. of their seeds.—*F. R. Hunter.*

11693A. OOSTING, HENRY J. (*Duke U.*) *Plants occurring on calcareous rock outcrops in North Carolina.* *Torreya* 41: 76-81. 1941.—Nine of the infrequent limestone outcrops in western N. C. were studied botanically. All are widely separated from areas of abundant limestone and each is isolated and restricted in extent. 4 obligate calciphiles were found of which *Asplenium resiliens* appeared consistently, *Cheilanthes alabamensis* at 2 stations, *A. cryptolepis* and *Carex plantaginea* at one. The calciphile *Cystopteris bulbifera* was found at 3 stations, which suggests its obligate nature under the extreme conditions. The survey indicates that, within their ranges, certain calciphiles tend to be present wherever there is limestone even though stations may be widely separated. Certain calciphiles tend to become obligate when near the extremities of their ranges. Those spp. favored by a calcareous substratum where it is generally available, may in N. Carolina be concentrated in alkaline habitats or may not be affected in numbers or distribution.—*H. J. Oosting.*

11694. PARTRIDGE, N. L. (*Michigan Agric. Exp. Sta., E. Lansing.*) *Comparative water usage and depth of rooting of some species of grass.* *Proc. Amer. Soc. Hort. Sci.* 39: 426-432. 1941.—10 spp. of grass were grown in 3-gallon iron pails filled with sandy soil which was brought up to approx. field capacity once or twice a week. The water loss was due to transpiration and evaporation from the surface and varied between species, smooth brome grass (*Bromus inermis*) and redtop (*Agrostis alba*) cultures losing about 78% more than timothy (*Phleum pratense*) cultures or the bare soil check. The same grasses were grown for one season in containers 4 ft. deep filled with sandy loam and the total quantity and distribution of the roots in depth detd. Total wt. of fibrous roots varied from 33.2 g. for redtop to 107.0 g. for smooth brome grass with 1.1% of the roots in the lower half of the can for sheep fescue (*Festuca ovina*) to 15.1% of them for smooth brome grass. These differences in growth habit should be considered in selecting a grass for use as an orchard cover.—*N. L. Partridge.*

11695. PURER, EDITH A. *Plant ecology of the coastal salt marshlands of San Diego County, California.* *Ecol. Monogr.* 12(1): 81-111. 16 fig. 1942.—The 12 salt marshes of the county may be placed in 3 groups. (1) Those with large bodies of water, open to the ocean, where the % of salinity is almost constant; (2) those traversed by fresh-water streams which flow throughout most of the year, and in which salinity fluctuates, with low percentages during the rainy season; and (3) small areas likewise traversed by fresh-water streams but which in this case flow only during the rainy season. Here salinity range is great, reaching high percentages during summer and autumn. According to the variation in salinity and the differences in aera-

tion, 60 marsh spp. are distributed throughout the area. In the lower littoral, the principal genus is *Spartina*, a xerophytic grass, with rolled leaves and abundant lacunae. In the middle littoral, there is *Salicornia*, a leafless half-shrub, with limited intercellular spaces, enduring some submergence and withstanding a varying salinity. In the upper littoral there is competition among a number of species, including *Monanthochloe* and *Distichlis*, grasses with rolled leaves propagated by runners and rhizomes, and with sufficient air spaces in their subsurface parts to withstand some submergence; *Batis* and *Suaeda*, both with succulent leaves and comparatively few air spaces; *Limonium*, a rosette plant of the mud flats, with small intercellular spaces in blade, petiole and root; *Frankenia*, with revolute leaves, many small intercellular spaces and abundant glands excreting salts over the leaf surface; and *Atriplex*, a succulent, covered with vesicles and possessing few air spaces.—*E. A. Purer.*

11696. RICHARDS, P. W. (*Cambridge, Eng.*) *Lowland tropical podzols and their vegetation.* *Nature [London]* 148 (3744): 129-131. 1941.—These podzols are derived from sands, or sandstones poor in bases. The vegetation is either heath-forest or evergreen scrub. In swamps wood-moors develop. These podzols occur in Borneo, Sumatra and in British Guiana.

11697. ROBERTS, J. H. (*Louisiana State U.*) *Topography and ecological situations on Grand Isle, Louisiana.* *Anat. Rec.* 81(4): suppl. 52. 1941.—An abstract.

11698. SEXTON, A. N. *Notes on the kauri-beech (*Nothofagus truncata*) association in Omahuta State Forest.* *New Zealand Jour. Forest.* 4(5): 308-310. 1940-1941.—The dominant trees in the stand are kauri (*Agathis australis*) and *Metrosideros robusta*. The subdominants (trees up to 40 ft. tall) include *Agathis australis*, *Nothofagus truncata*, *Podocarpus hallii*, *Dacrydium cupressinum*, *Phyllocladus trichomanoides*, *Persoonia toru*, and *Elaeocarpus dentatus*. Associated vegetation is listed.—*W. N. Sparhawk.*

11699. STEENIS, C. G. G. J. van. *Oekologische eigenschappen van pionierplanten.* [Ecological properties of pioneer plants.] *Tectona* 34(8/9): 557-567. 1941.—Some characteristics of pioneer plants are: abundant seed production, frequently of hard-shelled seed, or seed that remains viable on the tree or other plant for yrs., until germination is stimulated by fire or other causes; rapid growth; early flowering and fruiting, with many spp.; dwarf forms on especially poor sites; morphological characteristics such as a protective mantle around terminal buds, scaly bark, dormant buds on the stem, great sprouting capacity, roots with mycorrhizas, runners, thorns, and subterranean root collars; tolerance for wide variation in soil and climate. There are some exotic pioneer plants in Netherlands E. Indies, such as *Opuntia*, *Lantana*, and *Eupatorium*, but many indigenous spp. must have lived in natural openings or breaks in the forest before man interfered.—*W. N. Sparhawk.*

11700. Van der PIJL, L. *Flagelliflory and cauliflory as adaptations to bats in Mucuna and other plants.* *Ann. Jard. Bot. Buitenzorg* 51(1): 83-93. 2 pl., 1 fig. 1941.—A general discussion with recorded observations on the visits of bats to the inflorescences of 4 spp. of *Mucuna* (flagelliflory) with a brief discussion of cauliflory. In the short introduction the author outlines the characters of flowers adapted to pollination by bats, including nocturnal flowering, odor, strong inflorescences, accessible nectar, color (dull or whitish), abundant nectar and pollen, and the position of the flowers (exposed), whether above the foliage or hanging on long peduncles.—*E. D. Merrill.*

11701. WENT, F. W. (*California Inst. Tech.*) *The dependence of certain annual plants on shrubs in Southern California deserts.* *Bull. Torrey Bot. Club* 69(2): 100-114. 1942.—Whenever lack of precipitation prevents a continuous cover of vegetation in Southern California, the dependence of certain annuals upon the presence of specific shrubs becomes evident. Especially for *Rafinesquia neomexicana* it was shown that its occurrence depended upon *Krameria* and *Franseria* in the 1st place, *Ephedra*, *Opuntia* and *Hymenoclea* in the 2d place, and *Larrea* and *Encelia* in the 3d place. Free-growing specimens were very rare. The aptitude of these shrubs for providing good growing conditions was also evidenced by the fact that the more fre-

quently *Rafinesquia* occurs with a given shrub, the larger are the specimens growing on that shrub, whereas the free-growing specimens are smallest. Similar relationships were found for *Caulanthus lasiophyllus*, *C. cooperi*, *Phacelia distans*, *P. tanacetifolia*, *Malacothrix californica*, *Delphinium parishii* and a few other annuals. Evidence is presented that the effect of the shrubs on the annuals surrounding them is due to chemical rather than physical factors. Other groups of annuals do not depend upon shrubs or organic material for their growth. Many of these are found in great abundance in open spaces in between shrubs.—F. W. Went.

11702. WILLIAMS, LLEWELYN. (Field Mus. Nat. Hist., Chicago.) The phytogeography of Peru. *Chron. Bot.* 6(17/18): 406-410. Map. 1941.—Maps the plant formations of Peru and describes each in some detail. Also summarizes the botanical explorations of the country.—L. J. Gier.

11703. WILLIAMS, LOUIS O. (Harvard U.) What is an epiphyte? *Amer. Orchid Soc. Bull.* 9(11): 302-303. 1941.—A short discussion of epiphytism, mainly concerning orchids. A true epiphyte is difficult to define and the distinction between epiphytism and terrestrialism is thought to be a quibble.—L. O. Williams.

11704. YUNCKER, T. G. (DePauw U.) The vegetation of Honduras, a brief review. *Chron. Bot.* 7(1): 26-27. 1942.—Although "wholly unexplored in the botanical sense" it has a large flora rich in endemic spp. An ecological treatment of the several areas studied.—L. J. Gier.

OCEANOGRAPHY

(See also Entries 11675, 11799, 13625, 13627, 13632, 13719)

11705. AIKAWA, HIROAKI. Recent planktological works in Japan. *Proc. Sixth Pacific Sci. Congr.* 3: 569-570. 1939 (1940).

11706. ALLEN, W. E. Summary of results of twenty years of researches on marine phytoplankton. *Proc. Sixth Pacific Sci. Congr.* 3: 577-583. 1939 (1940).

11707. ALLEN, WINFRED EMORY. (U. California, La Jolla.) Twenty years' statistical studies of marine plankton dinoflagellates of Southern California. *Amer. Midland Nat.* 26(3): 603-635. 11 fig. 1941.—By thousands of catches taken at daily intervals through 20 yrs. it was shown that there is a definite "year pattern" of occurrence of armored dinoflagellates, notable abundances tending to appear in late spring. Only 4 spp. reached real prominence for the 2 decades. In Southern California seas, off-shore catches indicated that large abundances did not occur more than 20 miles from shore or at depths greater than 30 meters in the open ocean. "Red water" was recorded only 4 times in 20 yrs. Years of exceptionally warm water were poorly productive. Numbers differed widely in totals and in seasonal distribution in different yrs. There was evidence suggesting 5- or 10-yr. periodicity in the extent of productiveness. Streakiness of populations was observable often at the surface of the sea, in addition to being indicated by the results of enumeration of samples. The effectiveness of collecting by measured water methods (including use of a silk infiltration net and a closing bottle) was demonstrated.—W. E. Allen.

11708. BOEREMA, J. Hydrographic survey in the Netherlands East Indian Archipelago. *Proc. Sixth Pacific Sci. Congr.* 3: 84-89. 1939 (1940).—A review.

11709. CHEVEY, M. P. Travaux de l'Institut Océanographique de l'Indochine. *Proc. Sixth Pacific Sci. Congr.* 3: 38-42. 1939 (1940).—A review covering publications in the period 1934-1937.

11710. CLARKE, GEORGE L. (Harvard U., Cambridge.) Observations on transparency in the southwestern section of the North Atlantic Ocean. Sears Foundation. *Jour. Marine Res.* 4(3): 221-230. 3 fig. 1941.—27 series of light-penetration measurements were made with Photronic cell photometers to depths as great as 133 m. in the southwestern section of the N. Atlantic Ocean. The water exhibited no important change in transparency with depth. A minimum av. value for the extinction coefficient of $k=0.037$ and a max. depth for the Secchi Disc of $D=47$ m. were observed. The region south of Bermuda and n. and w. of the Antilles was found to contain the clearest ocean water known and to be relatively homogeneous in respect to transparency. Off the coast of Guiana a sharp drop in transparency was encountered. To the southeast and to the northwest of Ber-

muda, the water is very clear but less so than farther to the south. A comparison of the Photronic photometer measurements with the Secchi disc determinations shows in general good agreement with the relation, $k=1.7/D$, reported by Poole and Atkins. At the depth of disappearance of the disc the illumination averaged 15% of the light incident at the surface. Individual variations suggest the possibility that important changes in the relative effects of scattering and absorption may occur in ocean waters.—G. L. Clarke.

11711. DEACON, G. E. R. The work of the "Discovery" Committee in the south Pacific Ocean. *Proc. Sixth Pacific Sci. Congr.* 3: 139-141. 1939 (1940).—A review.

11712. DELSMAN, H. C. (Hilversum, Holland.) Preliminary plankton investigations in the Java Sea. *Treubia* 17: 139-181. 8 maps, 41 fig. 1939.—The marine macro-population is dependent on the plankton fauna and flora, which are influenced by the water salinity and P_2O_5 content. Observations made in the Java Sea in April, at the end of the wet, west monsoon, and in Oct., at the end of the dry, east monsoon, confirm the general observations of other investigators that the tropical seas are poorer in fish and plankton life than seas of more northerly latitudes; salinity and phosphate content are less favorable. The more uniform surface temp. of seas in the tropics prevents the fertile water at the bottom from being stirred to the surface, which is made possible in northern seas by seasonal changes in temp. Diatom plankton generally was heaviest along the coasts, narrowly along Java, along Borneo in a broader strip, but except for one species, *Coscinodiscus gigas*, was absent in the center of the Sea; although a great many species were found, only a few predominated. *Trichodesmium* spp. and related Schizophyceans were always found at a distance from the coast, generally in long, narrow strips. *Noctiluca* was restricted to coastal and brackish water. Copepods were found near the coast, to predominate at some distance off-shore and to be nearly absent in the middle. Larger Crustaceans predominated at some distance from the shores and throughout the middle. Numerous other zooplankton groups were recorded, but insufficiently to establish distribution.—R. M. Fox.

11713. DUNBAR, M. J. (Nation. Res. Coun., Ottawa.) Marine macroplankton from the Canadian eastern Arctic. I. Amphipoda and Schizopoda. *Canadian Jour. Res. Sect. D. Zool. Sci.* 20(1): 38-46. Map, 10 fig. 1942.—24 amphipod spp. (incl. *Metopa longirama*), 3 euphausiids, and 2 mysids are recorded from the coastal water of the Canadian eastern Arctic. Most of the records are new. The list is representative of a high Arctic plankton, giving no evidence of the intrusion of Atlantic water. This is in agreement with the hydrographic observations made, and with available hydrographic data from other sources. The plankton is contrasted with that found in 1936 in Disko Bay, west Greenland, where there appears to be an upwelling of mixed Arctic and Atlantic water. The difference between the plankton of the two sides of Baffin Bay suggests the possibility of distinguishing water of Lancaster Sound (Canadian polar water) from that of west Greenland by means of their planktonic fauna.—Auth. abst.

11714. FRASER, C. McLEAN. Oceanography in British Columbia. *Proc. Sixth Pacific Sci. Congr.* 3: 20-33. 1939 (1940).—A review with extensive bibliography.

11715. GOODHART, C. B. (Cambridge U.) The ecology of the Amphipoda in a small estuary in Hampshire. *Jour. Animal Ecol.* 10(2): 306-322. 1 fig. 1941.—A list of 18 spp. is given with detailed notes as to their habitats and especially of the limits of salinity in which they are found. Another list of 25 wholly marine spp. found outside the mouth of the river is also given.—S. C. Kendeigh.

11716. KLEINSMID, RUFUS B. von. Marine research at the University of Southern California. *Proc. Sixth Pacific Sci. Congr.* 3: 124-126. 1939 (1940).—A brief review with bibliography.

11717. SVERDRUP, H. U. Activities of the Scripps Institution of Oceanography, La Jolla, California. *Proc. Sixth Pacific Sci. Congr.* 3: 114-123. 1939 (1940).—A review with extensive bibliography.

11718. UDA, MITITAKA. A sketch of the recent development of hydrographical researches in the seas adjacent

to Japan. *Proc. Sixth Pacific Sci. Congr.* 3: 44-72. 1939(1940).—A review. 231 references.

11719. VISSER, S. W. The "Snellius" expedition in the eastern part of the Netherlands Indies, 1929-1930: Surface observations, temperature, salinity, density. *Proc. Sixth Pacific Sci. Congr.* 3: 143-145. 1939(1940).

11720. WIBORG, K. F. (*Biol. Lab., Oslo.*) The production of zooplankton in the Oslo Fjord in 1933-1934, with special reference to the copepods. *Norske Vidensk.-Akad. Oslo. Hvalradets Skrift. Sci. Results Marine Biol. Res.* 21: 1-87. 1940.—Zooplankton material was collected at several stations from the inner to the outer fjord on 7 cruises from June 1933 to May 1934, with supplemental obs. in 1938. Vert. hauls were usually taken in 2 steps, 0-50 m. and below 50 m. The inner fjord is not regularly mixed below the threshold at 20-40 m. Quant. and qualit. changes differ at the diff. stations; surface currents are important in carrying neritic spp. outward and Atlantic spp. inward, and in "stowing up" some forms at intermed. stations. The greatest mean volume of zooplankton was found in April and the least in Feb. Copepods form the great bulk of the zooplankton, and their distr. is descr. in detail, 32 spp. being identified. The commonest are 8 or 9 calanoids and 3 cyclopoids. *Calanus finmarchicus* has at least 2 spawning periods, March-April and July; it winters as copepodite V, usually at deep stations; younger stages live above 50 m. In stage V it is subjected to very low O_2 tensions in the stagnant inner fjord. Spawning periods are recorded for all the common spp., and among these spp. at least 5 types of horiz. distr. are found: Surface forms with maximum in inner fjord—*Centropages hamatus*, *Acartia longiremis*, *Oithona helgolandica*, *O. nana*; surface forms with maximum in outer fjord—*Acartia clausi*, *Paracalanus parvus*, *Centropages typicus*, *Temora longicornis*; epipelagic forms, found in deeper water in the outer fjord—*Calanus finmarchicus*, *Pseudocalanus minutus*; deep water forms, found deeper in outer fjord—*Calanus hyperboreus*, *Microcalanus pygmaeus*, *Euchaeta norvegica*, *Metridia lucens*, *Oithona spinirostris*; deep water forms with maximum in inner fjord—*Metridia longa*, *Oncaea borealis*. Spawning of all spp. begins earlier in the outer fjord, and the vert. distr. of all spp. is more restricted in the inner fjord.—E. S. Deevey.

11721. ZOBELL, CLAUDE E. (*U. California, La Jolla.*) Apparatus for collecting water samples from different depths for bacteriological analysis. *Jour. Marine Res.* 4(3): 173-188. 3 fig. 1941.—The merits of different types of water sampling apparatus are discussed. Containers made of Cu, Zn, Sn, or Ni alloys are not suitable for the collection of samples of sea water for bacteriological analysis due to the harmful oligodynamic action of heavy metals. From 8 to 58% of the bacteria are devitalized after being stored in brass containers for 1 hr. and the sea water itself may be rendered bacteriostatic by exposure to metals. The effect is apparent in 5 min. The depth to which sealed glass containers can be used is limited by the hydrostatic pressure of the water—which increases one atmos. for each 10 m. An apparatus is described which can be used on the standard hydrographic wire or cable for the collection of water samples aseptically from any desired depth. Multiple units provide for the simultaneous collection of samples from several depths. The sampler, known as the "J-Z," can also be used advantageously for collecting samples of fresh water. For depths greater than 200 m. a collapsible rubber bottle is recommended. High hydrostatic pressures do not interfere with the operation of the rubber bottles—which are described.—C. E. Zobell.

LIMNOLOGY

(See also Entries 11673, 11799, 12914, 13797, 13799)

11722. BRAMBEL, C. E., and R. P. COWLES. (*Johns Hopkins U.*) Chemical and physical conditions affecting the occurrence of iron in the waters of Back River and its tributaries. *Anat. Rec.* 81(4): suppl. 110. 1941.—An abstract.

11723. COWLES, R. P., and C. E. BRAMBEL. (*Johns Hopkins U.*) Fauna and flora of Back River, during 1941. *Anat. Rec.* 81(4): suppl. 111. 1941.—An abstract.

11724. EMOTO, Y. (*Peers Sch., Tokyo*), and H. HIROSE (*Imp. U., Sapporo, Hokkaido*). Studies on the thermal flora of Japan. IV. Thermal bacteria and algae from the hot springs of Mts. Adatara and Azuma. [With Ger. summ.]

Bot. and Zool. (Syokubutu Oyobi Dobutu) 8(12): 1883-1890. 1940.—Both Mt. Adatara and Mt. Azuma are situated in the northern part of the Japanese main island (Honsyu). The authors found 40 spp. and vars.; viz., 10 spp. of *Bacteria*, 21 spp. and 4 vars. of *Cyanophyceae*, 2 spp. of *Chlorophyceae*, 2 spp. of *Conjugatae* and 1 sp. of *Flagellatae*. *Homoeothrix thermalis* and *Oscillatoria constricta* var. *tenuis* (*Cyanophyceae*) are descr. as new.—N. Kamiya.

11725. HUTCHINSON, G. EVELYN. (*Yale U.*) Ecological aspects of succession in natural populations. *Amer. Nat.* 75(760): 406-418. 1941.—Brief critical review of supposed ecological factors affecting protistan populations, especially in plankton. Pearsall's observations on *Dinobryon* are compared with unpublished data of the author's, and with the findings of other investigators. A rise in the $N\cdot NO_3$: $P\cdot PO_4$ ratio or a fall in the SiO_2 conc. is often concomitant with *Dinobryon* maxima. Probably both in this case and more generally, chem. factors primarily act by altering the competitive relations between species, rather than by eliminating species through direct transgression of tolerance limits.—G. E. Hutchinson.

11726. LINDEMAN, RAYMOND L. (*U. Minnesota.*) Seasonal food-cycle dynamics in a senescent lake. *Amer. Midland Nat.* 26(3): 636-673. 5 fig. 1941.—Cedar Bog Lake, Minnesota, which has been the subject of a 4-yr. study in dynamic ecology, represents a late stage of eutrophic senescence. The major food-cycle relationships are diagrammed and discussed. The quantitative seasonal distribution of food groups showed remarkable variation from yr. to yr. which seemed to be correlated at least in part with climatic fluctuations resulting in changes of lake level and chem. composition of the water. The mean ratios of producers:primary consumers:secondary consumers were 70.3: 7.0:1.3 cal/cm²/yr. Annual variation was relatively greatest for the secondary consumers and least for the producers. The relative annual production of the food groups, as might be anticipated on theoretical grounds, indicated an efficiency of food conversion much lower than the probable physiol. efficiency of the species involved.—R. L. Lindeman.

WILDLIFE MANAGEMENT—AQUATIC

(See also Entries 11968, 12955, 13696, 13711, 13924)

11727. ALLEN, K. RADWAY. (*Freshwater Biol. Assoc. Ambleside.*) Studies on the biology of the early stages of the salmon (*Salmo salar*). 3. Growth in the Thurso River System, Caithness. *Jour. Animal Ecol.* 10(2): 273-295. 3 fig. 1941.—The growth of young salmon in 3 tributaries of the Thurso River in northern Scotland between Aug., 1937, and Oct., 1938, is compared with a similar study in the river Eden, published previously. Growth of the salmon occurs only between Apr. and Sept. and is slower during the latter than during the early part of the summer. The amt. of food in the stomach of salmon is greatest during the early part of the summer, when growth is rapid, and then falls steadily to the low value that is maintained over winter. Seasonal changes in the condition factor, $(10^4 \times W)/L^3$, correlate positively with changes in the growth rate. Feeding and growth in the salmon depend on the water temp. surpassing a threshold of 7°C. The time growth begins in the spring is correlated in various rivers with the date of the rise of temp. to this threshold. Total annual increment of growth in the Thurso River System is < in the Eden. The ratio of the amt. of growth from Aug. to Oct. to the amt. from June to Aug. is the same in the 2 rivers for the 1st year of life of the fish but varies widely during the 2d. In both yrs. the rate of growth in late summer is relatively higher in the Eden than in the Thurso System. Max. temps. and seasonal variations in the food supply appear to modify only slightly the rate of growth. The size of the fish population bears the same positive relation to the food supply as does the rate of growth in early summer. Comparison between the 2d-yr. increment of growth and the date of rise of temp. to 7° throughout the natural range of the salmon shows that while this factor may affect the amount of growth in restricted areas, as the British Isles, some other factor may be of greater significance in determining its magnitude in different parts of the range.—S. C. Kendal.

11728. COE, W. R., and D. L. FOX. (*U. California.*) Influence of temperature, food supply and age on the rate of

growth of the California sea-mussel (*Mytilus californianus*). *Anat. Rec.* 81(4): suppl. 127. 1941.—An abstract.

11729. COLE, WILLIAM H. (*Rutgers U.*) The effects of daily bleeding of lobsters. *Anat. Rec.* 81(4): suppl. 128. 1941.—An abstract.

11730. DAVIDSON, F. A., and ELIZABETH VAUGHAN. (*Fish and Wildlife Serv.*) Relation of population size to marine growth and time of spawning migration in the pink salmon (*Oncorhynchus gorbuscha*) of southeastern Alaska. *Jour. Marine Res.* 4(3): 231-246. 1 fig. 1941.—The relationship between the cyclic trends in the characteristics of the pink salmon populations leads to the conclusion that when the populations are large the individuals composing them are usually small and the majority of the fish migrate to the streams late in the season; and when the populations are small the individuals composing them are usually large and the majority of the fish migrate to the streams early in the season. The pink salmon have an invariable 2-yr. cycle and must return to the streams to spawn at the close of their 2d year of life regardless of the growth they have attained while in the ocean. Therefore, a biol. explanation of the relationship between population size, growth and seasonal time of the spawning migration of the salmon is hypothesized on the basis of a variable competition between the individual salmon for food in the ocean as their numbers increase or decrease. This in turn directly influences the rate of growth of the salmon and the subsequent time of their spawning migration to the streams.—F. A. Davidson.

11731. EDMONDSON, C. H., and I. H. WILSON. The shellfish resources of Hawaii. *Proc. Sixth Pacific Sci. Congr.* 3: 241-243. 1939(1940).

11732. HASLER, ARTHUR D., and WILLIAM M. FABER. (*U. Wisconsin*) Tagging methods for lower vertebrates. I. Roentgenographic recognition of fish tagged with thorium dioxide. *Anat. Rec.* 81(4): suppl. 112. 1941.—An abstract.

11733. LEFÈVRE, MARCEL. Sur la résistance de certaines algues d'eau douce à l'action des sucs gastro-intestinaux des poissons. *Compt. Rend. Acad. Sci. [Paris]* 210: 347-349. 1940.—Cultures were made of fecal matter taken aseptically from the intestines of 3 spp. of fresh-water fish—*Cyprinus carpio*, *Gardonus rustilus*, and *Brama brama*—using a culture medium containing 0.2 g. KNO_3 , 0.04 g. (K_2HPO_4), 0.03 g. MgSO_4 , 0.1 g. $\text{Ca}(\text{NO}_3)_2$, 1 drop Fe perchlorate, and 1000 ml. dist. water. The results show that most of the spp. of algae that escape the action of the gastro-intestinal juices of fishes are in the *Protococcales*; then come the *Flagellates*, the *Cyanophyceae*, the *Dinoflagellates* and the *Volvocales*. Desmids and many diatoms seem particularly susceptible to attack, as are also many *Volvocales* and certain colonial *Cyanophytes* (*Gomphosphaeria*).—D. H. Rose.

11734. MCKENZIE, R. A. (*Atlantic Biol. Sta.*) Canadian Atlantic offshore cod fishery east of Halifax. *Fish. Res. Bd. Canada. Bull.* 61. 1-13. 5 maps. 1942.—The average yield for this fishery, prosecuted chiefly on the Western banks, Banquereau, St. Pierre and Grand banks, was in 1938 and 1939 about 64,000,000 lb. This catch, (40% of the Canadian total) shown graphically, has been allocated by months to the fishing regions where it originated. Off Nova Scotia, U. S. operations exceed Canadian and increase with proximity to the Gulf of Maine. The "salt fishermen," operating only from Lunenburg County and from March to Sept. land about 32,000,000 lb., 24 million of it from the Grand banks. The "fresh fishermen," operating all the year from certain ports land the other half of the catch. They fish the western grounds in winter and the eastern grounds—but very rarely the Grand banks—in summer, shifting operations seasonally. The peak in "salt" cod landings occurs in Sept. and in "fresh" cod landings in April. To the "salt fishermen" the Grand banks rank first, but to the "fresh fishermen" the Western banks, St. Pierre and Banquereau stand in the order mentioned.—R. A. McKenzie.

11735. MEEHEAN, O. LLOYD. (*Fish and Wildlife Serv.*) The development of a method for the culture of largemouth bass on natural food in fertilized ponds. *Ohio State Univ. Abst. of Doctor's Dissert.* 33. 183-190. 1940.—Printed abstract outlining research leading to a method of culture of warm water fishes. It includes preliminary barrel experiments with fertilizer; fertilization and its effect on pond

ecology (bass in particular) covering a period of 3 yrs. The C/N ratio was determined for bottom muds; analysis of aquatic vegetation for fertilizing value; food studies of fingerling bass; growth rate and survival of fingerlings, with a method for detecting cannibalism in ponds. The chemical characteristics of various types of waters over a typical season are shown. There is outlined the investigation of fish-cultural methods involving forage fish expts., the development of the Welaka method of bass culture, and a summary of the results. The original dissertation included 21 tables, 4 figs., and a 5-p. bibliography.—O. L. Meehan.

11736. NEEDLER, A. W. H. Oyster farming in Eastern Canada. *Fish. Res. Bd. Canada. Bull.* 60. 1-83. Frontispiece, 1 map, 21 fig. 1941.—A bulletin summarizing information applicable to oyster farming in Eastern Canada. Life history of *Ostrea virginica* in the region is reviewed including the long larval period, slow growth and other characteristics of cold oyster waters. Canadian Atlantic areas suitable for oyster culture are limited to southern Gulf of St. Lawrence and Bras d'Or lakes in Cape Breton Island. Selection of grounds and methods of spat collection, rearing small oysters and producing mature oysters of good quality which are effective in the region are set forth. Starfish (*Asterias vulgaris*) are the most serious enemies. Only *A. vulgaris* a cold-water form is present and does not attain as large a size on oyster grounds as does *A. forbesi*. Drills (*Urosalpynx cinerea*) are not as serious as in southern waters. Other enemies are of minor importance. Methods of fishing, storing, packing, grading and marketing are reviewed. Canadian Atlantic oysters are usually marketed in the shell and often stored alive for periods up to 4 months at temps. just above freezing. Protection of wood from shipworms (*Teredo*) is reviewed including cheap surface protection provided by a mixture of tar, copper oleate and kerosene. An epidemic disease of oysters destroyed over 90% of the stocks in certain Prince Edward Island areas. Progeny of survivors of an early epidemic have been shown to be resistant to recent outbreaks. Relation of the oyster industry to public health is discussed, including standards of safety, purification methods and lower contamination of oysters in winter.—A. W. H. Needler.

11737. SIMON, JAMES R. (*Wyoming Fish Warden*) The whitefish. A neglected resource. *Wyoming Wild Life* 6(9): 1-3. 2 pl. 1941.—The Wyoming status of the Rocky Mt. whitefish or mountain herring is given.—R. B. Williams.

11738. SMITH, RICHARD T. Temperature-controlled variations in the rate of development of *Psettichthys melanostictus*, a Pacific flounder. *Proc. Sixth Pacific Sci. Congr.* 3: 431-434. 1939(1940).—The ova were incubated at constantly maintained temps. of 7.5, 9.1, 10.8, 12, 14.7, and 16.8°C. They were kept in a pelagic state throughout the period of incubation, imitating their natural environment. Increases of temp. influenced the rate of development most between 7.5 and 12°C. The curve of the rate of development as a function of the temp. fell sharply at the higher temps. The data for the hatching times at temps. between 12 and 16.8° are expressed by a straight line. Possible adverse effects of the low temp. on hatching enzymes, or unknown causes, cause the data from the hatching of ova incubated at the 3 lowest temps. to diverge from the usual straight-line relationship.—Auth. summ.

11739. STORROW, B., and DOROTHY COWAN. (*Dove Marine Lab., Cullercoats, Northumberland*) Herring investigations. *Rept. Dove Marine Lab.* 8. Ser. III. 6-16. 1941.—The herring fishery of the Northumberland shoals was sampled during the 1939 season as in previous years. Data are presented on scale records, length, sex, maturity, for 17 samples of 3,547 fish. The fishery depended chiefly on the 1935 year-class, fish with 4 winter rings, few fish with 2 winter rings were taken, and the size and age increased as the season progressed.—J. L. Wilding.

11740. VESTAL, ELDEN H. Rough fish control in Gull Lake, Mono County, California. *California Fish and Game* 28(1): 34-61. 10 fig. 1941.—Gull Lake, a 68-acre glacial lake, infested with chubs, was treated with 3300 lbs. of timbo (*Lonchocarpus urucu*) powder containing 5% rotenone at a conc. by wt. of 1 part timbo to 2 million of water. The treatment killed an estimated half million chubs. Of 254 trout removed, 78 survived for re-planting elsewhere in the

drainage. 51 days later the lake was restocked with 76,200 eastern brook trout averaging 1.1 per ounce (about 5½ in. long). A year after replanting Gull Lake had yielded to anglers an estimated 10,000 trout averaging 7 in. long.—*E. H. Vestal.*

11741. WORTHINGTON, E. B. (*Freshwater Biol. Assoc., Wray Castle.*) Perch in British lakes. A new fishing industry. *Nature [London]* 148(3761): 651-652. 1941.—Methods of trapping and canning the perch and pike which tend to supersede the more desirable char (*Salvelinus willoughbii*) and brown trout are discussed.—*E. D. Crabb.*

WILDLIFE MANAGEMENT—TERRESTRIAL

(See also Entries 13030, 13531, 13987, 13988, 13989, 14014, 14075, 14090)

11742. BARREDA, CARLOS A. Proyecto de ley, ampliando los efectos de la ley No. 9147, sobre protección del estado a las aves salvajes y otros animales. [Amendment to law No. 9147 on the protection of wild birds and other animals.] *Bol. Mus. Hist. Nat. "Javier Prado"* 5(3): 408-412. 1941.—Protected birds are listed.—*W. C. Tobie.*

11743. LEEDY, DANIEL LONEY. (*Ohio State U.*) Natural pheasant production in relation to agricultural land-use. *Ohio State Univ. Abst. of Doctor's Dissert.* 38. 115-124. 1940.—The pheasants occurring in Ohio, although commonly known as *Phasianus colchicus torquatus*, are of mixed blood and at least three races—*torquatus*, *mongolicus* and *colchicus*—are involved. They are most abundant in parts of northwestern Ohio where there are populations of about

300 pheasants per square mile. They are least abundant in the unglaciated hilly region of southeastern Ohio. Climatic, edaphic and topographic factors are of great importance in the ecology of pheasants, as they form the foundation of the various biological, social and land-use patterns. In general the dark, fertile, glacial limestone and shale or lacustrine limestone soils, with poor natural drainage and originally covered with a swamp forest or prairie type of vegetation, are best adapted for pheasant production in Ohio. These soils are productive of the corn, soybeans, wheat and associated weeds, such as lesser ragweed (*Ambrosia elatior*), smartweeds (*Polygonum* spp.), and foxtail grasses (*Setaria* spp.), which form the most important food items of Ohio pheasants. Fortunately much of the grain consumed is waste. Harvesting methods and farming practices affect pheasants directly. Corn picking from the stalk is rapidly replacing the older method of cutting, shocking and husking corn in Ohio. The stalks provide valuable cover and when the corn is picked by machine much waste is available as food. The use of combines in harvesting wheat, oats and soybeans is becoming more prevalent each year and the resulting high stubble, if not clipped by mowing machines later in an attempt to control ragweeds, is valuable for cover. Hay mowing operations result in casualties at the rate of about 31 hen pheasants per 100 nests located in hay. Pasturing, cutting and burning are the 3 factors largely responsible for limiting the cover afforded pheasants by fencerows, woodlots, drainage ditches and other relatively permanent cover areas.—*D. L. Leedy.*

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GENERAL BIOLOGY

Editors: A. H. GRAVES, *Plant*; C. A. KOFOID, *Animal*

(See also Entries 14299, 14301, 14790, 14796, 14806, 15207, 15449, 15615, 15706)

TAXONOMY AND NOMENCLATURE

14097. BOYDEN, ALAN. (*Rutgers U.*) Systematic serology: A critical appreciation. *Physiol. Zool.* 15(2): 109-145. 1942.—The task of systematic serology as applied to animals is the investigation of the possible uses of serological reactions in the determination of animal relationships, and the applications of whatever techniques may be found useful as effectively and extensively as can be done. The importance of systematic serology to the general zoologist depends on the biological significance of knowledge of animal relationship itself and on the need for some additional basis for its determination. That there is need of systematic serology is evident from the facts that we still have many phyla of uncertain systematic position and that the generally accepted principles of taxonomy are apparently incapable of leading to a truly natural system of classification. A survey of the chief contributions of systematic serology during its 40-odd yrs. of existence shows that systematic serology is far from having accomplished its task. This is due to many causes such as use of relatively crude techniques, comparison of complex mixtures of antigens of unknown composition, use of antisera of widely different ranges of reaction and grades of specificity, and general lack of understanding of conditions which contribute to the production of good serological research. In spite of these handicaps positive achievements of great potential value to systematic zoology have been made. Thus it has been definitely established that chemical similarities in antigens are revealed by the agglutinin and precipitin reactions and these similarities may be as strongly inherited as any morphological characters. The theory of systematic serology is therefore sound and the attainment of a truly natural system of classification through a synthesis of the results of comparative classification through a synthesis of the results of comparative morphology and comparative serology is possible. Particular studies, such as those of Cumley, Arrhenius and Hamburger, DeFalco, Irwin and Cole, Schur, Wilhelmi, and Wolfe, give data for the determination of systematic relationships as valid as any provided by morphology. The fact is that systematic serology has only begun; in its present state it corresponds to the comparative morphology of 200 yrs. ago and the potential contribution of systematic serology to the development of a truly natural system of classification of animals appears to be large considering that the sources of error in sero-

logical reactions are constantly being eliminated and improved techniques developed.—*Alan Boyden*.

NATURE STUDY

14098. MCGOWAN, DAN. A naturalist in Canada. xii+284p. Frontispiece, 20 pl. Macmillan Co.: Toronto, 1941. Pr. \$3.—The book is based on a series of popular broadcasts by the author on Canadian natural history. The topics covered are the pronghorn antelope, the spring song of toads and frogs, herbs, the osprey, the mole, fungi, the whitefish, the ages of wild animals, seed distribution, insects, the golden eagle, unnatural history, the names of wild flowers, horned owls, the reactions of wildlife to forest fires, the pack rat, the inland flight of gulls, the color of glaciers, the natural history of bees, feeding adaptations of birds, bats, weed, wind and rain, the crow, edible game, great trees, food fish, falcons, wild fruits, fossils, the foods of birds, curious facts about birds, edible wild plants, winter pelages, pelican colonies, wild flowers, and wildlife at Christmas time. Illustrations are from the author's photographs and drawings by Carl Rungius and Bruce Horsfall.—*C. A. Kofoid*.

THE LIBRARIAN'S GUIDE

Here is one use to which an enterprising librarian puts *Biological Abstracts*. As each issue is received she goes through it and checks all of the abstracts of interest to faculty members. Then, if the originals are not in the library, she sends post-cards to the authors requesting reprints. When she finds that she is consistently requesting reprints from one journal she recommends subscribing to that publication.

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ETHNOBIOLOGY

(See also Entries Sunspot cycles, 14168; Folk medicine of Brazilian indigenes, 15303; Banana migration, 15425)

14099. BLACKWOOD, BEATRICE. Use of plants among the Kukukuku of Southeast-central New Guinea. *Proc. Sixth Pacific Sci. Congr.* 4: 111-126. 1939(1940).—General notes on plant species used for food and food accessories, decoration, ceremonies, crafts, medicine and magic, rather more from an anthropological than from a botanical standpoint, although the technical names of many species used are given. The paper closes with a tabulation of somewhat over 100 spp., with their Latin and local names, portions used, and purpose and manner of use.—*E. D. Merrill*.

14100. HANDY, E. S. CRAIGHILL. The importance of recording native systems of horticulture and therapeutics and the technical knowledge required therein. *Proc. Sixth Pacific Sci. Congr.* 4: 127-130. 1939(1940).—A plea to field ethnologists to record horticultural, agricultural, and therapeutical data in detail, associated with accurate determinations of the species involved, stating that in 20 years of Polynesian research, concerned mainly with historical and comparative problems, he has found no data more significant and tangible than those appertaining to horticulture,

as these data provided a sound basis for reconstruction of the old social, economic, and political order.—*E. D. Merrill*.

TEXTS AND EDUCATION

14101. DAY, CHAPIN W., and MARGARET RITCHIE. *Studies and activities in biology*. [Edited by JOHN W. RITCHIE.] vi+218p. Illus. World Book Co.: New York, 1942. Pr. \$8.00.—A laboratory guide for teaching high school biology by the scientific method. The unit plan of procedure includes fundamental aspects of plant and animal organisms pertinent to the understanding of biological principles and their application to human activities. Structure, physiology, behavior and heredity are included in the various problems organized under each unit with assignments for factual data by directed observations, questions, text figures and quizzes.—*Olga Lakela*.

14102. de LAUBENFELS, M. W. *Life science*. iii+320p. 1022 fig. Publ. by the Author: Pasadena, 1941. Pr. \$3.—A college textbook, designed for students to whom biology is a basic ("cultural") element in education, rather than for the training of professional biologists. The text features the biological subject-matter that will enable the student to apply the methods and attitudes of science to the situations encountered in life. The chapters on Embryology, Histology, Anatomy, Physiology, Hygiene, Immunology, and Dietetics, in particular, include man prominently among the types studied. The text is lithoprinted from typescript, enabling the use of numerous illustrations, nearly all original and well chosen to "tell a story." The chapter on Anthropology is a noteworthy feature.

14103. HEGNER, ROBERT W. (*Johns Hopkins U.*) *College zoology*. 5th ed. Macmillan Co.: New York, 1942. Pr. \$3.75.

14104. MOMENT, GAIRDNER B. (*Goucher Coll.*) *General biology for colleges*. xix+661p. Frontispiece, 6 maps, 324 fig. D. Appleton-Century Co., Inc.: New York, 1942. Pr. \$4.—This book is written for a year's course or by omissions for a semester's course of college grade. Its chapters deal with foundations; characteristics of living things; classification; plant architecture; plant functions of nutrition, conduction, support, and absorption; metabolism; behavior and growth; reproduction; relationships of plants and animals; survey of animal architecture; protection, support and motion; circulation; nutrition; respiration; excretion; nervous coordination; sense organs; hormonal coordination; reproduction; development; heredity; evolution and the origin of species; history of life; and the animal kingdom. The treatment is predominantly physiological, and there is more than usual historical matter scattered through the chapters. The illustrations are ample and excellent.—*C. A. Kofoid*.

MISCELLANEOUS

14105. COMPTON, KARL T., ROBERT W. TRULLINGER, and VANNEVAR BUSH. (*essays by*) *Scientists face the world of 1942*. [With commentaries by HARVEY N. DAVIS, DETLEV BRONK, and S. W. FLETCHER.] 80p. Rutgers University Press: New Brunswick, 1942. Pr. \$1.25.—"Scientists face the world of 1942," by KARL T. COMPTON, is the first of the 3 essays in the volume. A brief review of the achievements of physics, chemistry, biology, mathematics, geology, engineering and medicine in the years immediately preceding the war reveals tremendous progress, with revolutionary new conceptions being established and important new techniques being mastered. But for the interruption of the World War, continuance of an extraordinarily rapid progress in pure and applied science might have been foreseen. As it is, the scientist has a primary duty of serving his nation, to safeguard humanity's progress

and the very conditions of free inquiry that have made that progress possible. A review of the role of scientists in the Nation's defense efforts, particularly the work of the Office of Scientific Research and Development, is then given. In "The Case for Biological Engineering," VANNEVAR BUSH points out that the rapid development of a new branch of science (e.g., electricity in the 19th century) with a sphere of possible application ordinarily evokes a professional class—the engineers—trained in the practical application of that science. One great application of biology—medicine—has developed a profession apart from engineering; the application of biology to agriculture has developed research men and technical consultants—not engineers—though a definite profession of agricultural engineering is becoming firmly established. Probable development of the food-processing and fermentation industries would seem to afford scope for a professional group of biological engineers; the type of training and methodology, of biological engineering, are briefly considered. ROBERT W. TRULLINGER presents "The Case for Agricultural Engineering."

14106. HAMBIDGE, GOVE. (*edited by*) *Farmers in a changing world*. U. S. Dept. Agric. Yr. Book 1940. xii+1215p. Illus. 1941.—The present volume consists of a series of papers on the economic and social tendencies in contemporary agriculture in the U. S. Papers of most interest to biology are:—American Agriculture—The First 300 Years, by EVERETT E. EDWARDS (p.171-276; bibliogr. 219 ref.); Agricultural Surpluses and Nutritional Deficits, by J. P. CAVIN, HAGEL K. STIEBELING and MARIUS FARIOLETTI (329-341); The Challenge of Conservation, by BUSHROD W. ALLIN and ELLERY A. FOSTER (416-428); Our Soil Can Be Saved, by H. H. BENNETT (429-440); The New Range Outlook, by W. R. CHAPLINE, F. G. RENNER and RAYMOND PRICE (441-457); Forest Resource Conservation, by R. E. MARSH and WILLIAM H. GIBBONS (458-488). Other papers deal with taxation, land-use planning, marketing and exports, agricultural policies of the U. S. government, etc.

14107. RUSSELL, E. J. *The function of applied biology in war time*. Ann. Applied Biol. 28: 170-177. 1941.—At the General Meeting of the Association of Applied Biologists, Sir John Russell opened the discussion on the functions of applied biology in wartime. These formed 4 groups: (1) biological warfare; (2) maintenance of public health; (3) protection of food supplies and other materials in field and store against deterioration; (4) increase of food supplies. The speaker dealt chiefly with (3) and (4). Recent successful work on some of the problems involved was mentioned; the main theme, however, was concerned with the numerous problems still awaiting solution, a list too long to mention here. In this war the advisory and executive activities are on a regional basis while the administrative and research services are centralized. This arrangement while possessing advantages has certain weaknesses, one being that research and advisory services may be out of touch with one another. The speaker concluded with the hope that wartime problems would not be immediately shelved as in the last war as soon as peace is restored. After a number of other members had continued the discussion it was resolved "that the Council bring to the notice of such authorities as they think desirable some of the pressing problems which exist to-day in applied biology and discuss with them the means of utilizing to the best advantage the services of applied biologists."—*Courtesy Hort. Abstr.*

14108. RUSSELL, JOHN. (*Rothamsted Exp. Sta.*) *Agriculture after the war*. Nature [London] 149(3766): 12-14. 1942.

BIBLIOGRAPHY

EILEEN R. CUNNINGHAM, *Editor*

14109. CANNON, CARL L. (*edited by*) *Guide to library facilities for national defense*. Rev. ed. 448p. American Library Assoc.: Chicago, 1941. Pr. \$1.25.—This guide lists concisely the resources in U. S. libraries useful for reference

and research service to national defense. The material is arranged under the following large headings: Aeronautics, Agriculture, Automobile Industry, Business and Commerce, Chemistry, Commodities, Communication, Construction,

Directories and Trade Catalogs, Electricity, Engineering, European War (1939-), Explosives, Finance, Fire Prevention and Control, Food Supply, Foreign Relations, Forestry, Fuels, Geography, Geology, Health, Insurance, Iron and Steel, Labor, Law, Machine Tools and Machine Inspection, Management, Manufactures, Maps, Mathematics, Metallurgy (non-ferrous), Meteorology, Military Science, Mines and Mining, Naval Science, Patents, Petroleum, Photography, Physics, Planning, Public Administration, Public Utilities, Safety, Scientific Instruments, Shipping, Social Sciences, Taxation and Public Finance, Technology and Science, Textiles, Transportation, War Contracts, War Risk Insurance, World War (1914-18). Under each heading the libraries are arranged by regions of the country, and each library has a note describing the collection on that particular subject. An index is provided.

14110. EMMETT, P. H., et al. Advances in colloid science. Vol. I. 415p. Illus. Interscience Publishers, Inc.: New York, 1942. Pr. \$5.50.—Consists of the following articles: The measurement of the surface areas of finely divided or porous solids by low temperature adsorption isotherms, by P. H. EMMETT (Johns Hopkins U.); The permeability method for determining specific surface of fibers and powders, by R. R. SULLIVAN and K. L. HERTEL (U. Tennessee); A new method of adsorption analysis and some of its applications, by ARNE TISELIUS (Upsala U.); Solubilization and other factors in detergent action, by JAMES W. MCBAIN (Stanford U.); Recent developments in starch chemistry, by KURT H. MEYER (U. Geneva); Frictional and thermodynamic properties of large molecules, by R. E. POWELL and HENRY EYRING (Princeton U.); The constitution of inorganic gels, by HARRY B. WEISER and W. O. MILLIGAN (Rice Inst.); The creaming of rubber latex, by G. E. VAN GILS and G. M. KRAAY (Exptl. Sta. West-Java, Netherlands East Indies); Streaming birefringence and its relation to particle size and shape, by JOHN T. EDSALL (Harvard Med. Sch.); Synthetic-resin ion exchangers, by ROBERT J. MYERS (Resinous Products and Chem. Co., Philadelphia); The study of colloids with the electron microscope, by THOMAS F. ANDERSON (RCA Manufacturing Co., Camden) and Anomalies in surface tensions of solutions, by ERNST A. HAUSER (Massachusetts Inst. Technol., Cambridge.).

14111. FEDERATION PROCEEDINGS. Volume 1, Number 1, (Pts. I and II), March, 1942. Managing Ed., D. R. HOOKER; Editorial Board: W. O. FENN, Chairman; PHILIP BARD, C. G. KING, MORTON McCUTCHEON, C. F. SCHMIDT, A. H. SMITH, and D. R. HOOKER. Quarterly. Pr. \$4.00 per vol. (\$4.75 foreign); single issues may be purchased, if ordered in advance, at prices to be determined at the time of issue.—To be published quarterly by the Federation of American Societies for Experimental Biology, 19 West Chase St., Baltimore, Md. The annual vol-

umes will comprise about 600 pages. The March issue of each yr. will contain the abstracts of papers to be presented at the scientific sessions of the Federation. These abstracts will be segregated as to Societies and indexed as to authors and subjects. The June, September and December issues will contain matter pertinent to the Federation membership and symposium and other special papers presented at Federation meetings as selected by the Editorial Board. The volume will be adequately indexed. Subscriptions and orders should be sent to the Managing Editor.

14112. THE INDIAN JOURNAL OF GENETICS AND PLANT BREEDING. Volume 1, December 1941. Executive Council: T. S. VENKATRAMAN, president; W. BURNS, and K. RAMIAH, vice-presidents; B. P. PAL, secretary; S. RAMANUJAM, treasurer; V. K. BADAMI, B. S. KADAM, J. S. PATEL, and T. S. SABNIS, councilors. Semi-annually. 86 pages, 6 articles. Published by the Indian Society of Genetics and Plant Breeding, New Delhi, India. Subscription price Rs. 16 (Rs. 15 in India).—The intent is to publish two issues per yr. (one in 1941). The following papers comprise the first issue: Some ideas and opportunities for plant geneticists in India by W. BURNS; Hybrid vigour in rice (*Oryza sativa* L.) by K. RAMIAH and K. RAMASAMY; Genic analysis of rice. II. Chlorophyll deficiencies by BABURAO S. KADAM; Colchicine-induced polyploidy in crop plants. II. Chilli (*Capsicum annuum* L.) by B. P. PAL, S. RAMANUJAM, and A. B. JOSHI; A cytological study of sterility in *Sesamum orientale* L. by L. S. S. KUMAR, and A. ABRAHAM; and Studies in the vernalization of Indian crop plants. I. Preliminary experiments on gram, wheat, chilli and soybean by B. P. PAL, and G. SURYANARAYANA MURTY.

14113. PAN AMERICAN SANITARY BUREAU. Latin American scientific societies and institutions. *Pan Amer. Sanitary Bur. Publ.* 141. [4] + 146p. 1942.—A directory arranged by subject, giving names and addresses of the President, Secretary or Director, and the titles of any serial publications issued. There is a subject index but no name index. It constitutes a considerably enlarged revision of the list published in 1940.

14114. RHODES, FRED H. Technical report writing. 125p. 7 fig. McGraw-Hill Book Co.: New York, 1941. Pr. \$1.50.—Deals with the characteristics of a good report; its organization; its form; styles, conventions, and correct usage; mathematical analysis of exptl. errors; graphical presentation of data; statistical methods; dimensional analysis; and the symbols commonly employed. It also shows how a laboratory notebook should be kept so that not only will it serve as the basis for a report but it will also be available as evidence in litigation.—Courtesy *Soil Sci.*

14115. RUCH, T. C., and J. F. FULTON. (Yale U. Sch. Med.) Growth of primate literature since 1800. *Science* 95(2454): 47-48. 1942.

EVOLUTION

ALFRED EMERSON, *Editor*

(See also Entries Cytogeography of *Sedum*, 14122; Of *Paeonia*, 14134, Hybridization barriers in plants, 14145; Ecotypes and adaptation to latitude, goldenrod, 14147; Speciation in *Drosophila*, 14163; Hybridity barriers in *Culex*, 14165; Evolution in dermatology, 14593; Speciation in bacteria, 14971; Variation in *Ranunculus*, 15199; Erect vs. prostrate plants, 15402; Geogr. races in insect parasites, 15519; Continental drift theory, 15543; Cerambycidae (Col.), 15626; Dipterous parasites of Diptera, 15629; Protective coloration and predation in birds, 15691)

14116. HIESEY, WILLIAM M., JENS CLAUSEN, and DAVID D. KECK. (*Carnegie Inst. Washington, Stanford U.*) Relations between climate and intraspecific variation in plants. *Amer. Nat.* 76(762): 5-22. 3 fig. 1942.—Species are defined as groups whose members can interbreed and produce subsequent generations of offspring as vigorous and fertile as the original parents. Included in the definition are individuals which, though mutually intersterile, may be linked together genetically through an intermediary. The ability of a species to occupy > 1 climatic zone obviously depends upon its racial diversity. Sp. of wide distribution generally consist of several climatic races, or ecotypes, as demonstrated by Tuesson and confirmed by the writers. Ecotypes are generally best fitted to survive

in habitats like those in which they occur naturally. Climatic races, however, are not homogenous. Examples of variation within coastal populations of *Achillea borealis* are presented. The most extreme maritime populations consist of short individuals, but populations only 1 mi. from the sea are twice as tall. At intermediate locations a mixture of individuals was found, some of which corresponded to those from the immediate coast, others to those 1 mi. from the coast. Such mixed populations would offer material for natural selection. When different climatic races are crossed, many new combinations of characters are found in the F_2 . In *Potentilla glandulosa* the reactions of an F_2 population of a cross between an alpine and a Sierran foothill race were compared at an alpine, a mid-Sierran and a coastal

station in California. Clone members of each individual were grown at all 3 stations. Marked individual differences in survival capacities are observed. This variation transgresses the limits of the parental types. Thus new climatic races may be synthesized by crossing and selection. The significance of such exptl. evidence for a conception of plant-climate interrelationships is discussed.—Authors.

14117. LEWIS, D. (John Innes' Hort. Inst., London.) The evolution of sex in flowering plants. *Biol. Rev. Cambridge Phil. Soc.* 17(1): 46-67. 1942.— Dioecious species of flowering plants have evolved from hermaphrodites either directly or more frequently through a monoecious intermediary. This evolution has taken place by the selection of single gene differences as shown by (a) the synthesis of dioecious strains of hermaphrodite plants, and (b) by the analysis of sex in dioecious species of plants. The mode of evolution of sex chromosomes which follows sexual differentiation is dictated by the conditions necessary for complete separation of the 2 blocks of ♂- and ♀-determining genes, but allows crossing-over within these 2 blocks. Dioecy in flowering plants is considered to be an alternative outbreeding mechanism, and its rareness is accounted for by 2 shortcomings (a) that the degree of outbreeding is inflexible, and (b) that utilization of gametes is wasteful. Gametic wastage is mitigated by changes in the sex ratio. Such changes are effected by the differential pollen-tube growth of ♂ and ♀ determining pollen grains. For this reason it is the ♂ that usually becomes the heterogametic sex.—D. Lewis.

14118. MILLER, ALDEN H. (U. California.) Habitat selection among higher vertebrates and its relation to intraspecific variation. *Amer. Nat.* 76(762): 25-35. 1942.—In addition to physical and biotic factors that isolate populations of vertebrate animals and influence thereby intraspecific variations, there are psychologic factors that come into play in choosing and adhering to a particular habitat. Habitat selection may limit the occurrence of a species far short of limits imposed by requirements of nutrition, reproduction and protection from predators. Both instinctive and learned habitat preferences effect partial isolation of populations.—A. H. Miller.

14119. PATTERSON, J. T. (U. Texas.) The *virilis* group of *Drosophila* in Texas. *Amer. Nat.* 75(761): 523-539. 1941.—*D. virilis* can be divided into gray and red forms because of a difference in pupa color. Of the 185 specimens collected in Texas in the past 2½ yrs., 168 belong to the gray form, 17 to the red form. The 2 forms have different types of habitat. The gray forms are found almost exclusively in stores and produce houses; the red forms are found in woods in the country. 3 subspp. have been recognized among the red forms: *D. v. americana*, *D. v. texana*, and *D. v. novamexicana*. Cytological and genetic studies show

that *americana* has been derived by a process of hybridization which occurred at some point along the lines of descent of *texana* and *novamexicana* and, that following the formation of *americana*, all 3 subspecies have undergone further diversification leading to isolation.—J. T. Patterson.

14120. SIMPSON, GEORGE GAYLORD. Antarctica as a faunal migration route. *Proc. Sixth Pacific Sci. Congr.* 2: 755-768. 1939(1940).—Existing data and arguments are reviewed, and some new data presented.—There is no known biotic fact that demands an Antarctic land-migration route for its explanation and there is none that is more simply explained by that hypothesis than by any other. The affinities of the southern faunas as a whole are what would be expected from the present northern connections of those continents and from similar connections known, or with considerable probability inferred, to have existed at appropriate times in the past. There are certain troublesome anomalies and exceptions in the evidence, but none of these can be adequately explained by postulating an Antarctic connection. The general wt. of the evidence is against such a connection.—From auth. concl.

14121. STEBBINS, G. LEDYARD Jr. (U. California, Berkeley.) Polyploid complexes in relation to ecology and the history of floras. *Amer. Nat.* 76(762): 36-45. 1 fig. 1942.—Polyploidy may serve as a valuable criterion for determining the relative age of different spp. and hence of the plant formations which they compose. This is because polyploids are always or nearly always derived from diploid ancestors. Three types of polyploidy are recognized; strict auto-polyploidy, allopolyploidy involving 2 or more distantly related spp., and a series of intermediate situations in which polyploids are derived from hybrids between closely related diploid spp. or subspp. The latter condition leads to the formation of the polyploid complex. An example is given in the species *Eriogonum fasciculatum* sens. lat. 3 entities are discussed. One diploid, subsp. *typicum* ($2n=40$), occurs in coastal Southern California and Lower California, and is adapted to a mild equable, semi-arid climate. Another subsp. *polifolium* ($2n=40$) occurs in the interior mountains and deserts of Southern California, and is adapted to a climate exhibiting extreme variations of temp. and a prolonged summer drought period. The third, subsp. *foliolosum* ($2n=80$), is common in the valleys of Southern California, and is the only form of *E. fasciculatum* found in the central Coast Ranges. It is intermediate in morphological characteristics and, judging from its distribution, combines the climatic tolerance of subsp. *typicum* and *polifolium*. Subsp. *foliolosum* occurs mainly in areas only recently uplifted from the sea, while the 2 tetraploids occur at least in part on older land. This situation is typical of polyploid complexes.—G. L. Stebbins, Jr.

CYTOLOGY

Editors: R. E. CLELAND, *Plant*; C. E. McCLUNG, *Animal*

(See also Entries 14138, 14164, 14524, 14527, 14884, 14903, 14912, 15197, 15212, 15256)

PLANT

14122. BALDWIN, J. T. Jr. (U. Michigan.) Cytological basis for specific segregation in the *Sedum nevii* complex. *Rhodora* 44(517): 10-13. 7 fig. 1942.—Alabama representatives of *S. nevii* are quite different in appearance and in chromosomes ($2n=12$, $n=6$) from Virginia plants ($2n=28$, $n=14$) usually referred to this species; the differences are of specific magnitude.—J. T. Baldwin, Jr.

14123. BOITEAU, P. (Bot. and Zool. Park, Tananarive, Madagascar.) Nouvelles observations cytologiques sur le Manioc cultivé. *Chron. Bot.* 6(17/18): 388. 1941.—Some new series of polyploids have been found. The chromosome numbers of the manioc plants studied were 8, 12, 16, and 24, with 4 as the basic haploid number. The relationship of stem wt. to increased chromosome number was studied in 5 vars. over a period of 5 years.—L. J. Gier.

14124. FULTS, JESS L. (U. Nebraska.) Somatic chromosome complements in *Bouteloua*. *Amer. Jour. Bot.* 29(1): 45-55. 38 fig. 1942.—The somatic chromosome complements

in *Bouteloua* have been investigated in 18 biotypes belonging to 7 spp. 114 plants from 85 seed sources including every state west of the 100th meridian to the Sierras excepting Idaho, Utah, and Nevada were studied. The chromosome numbers found were: *B. breviseta* $2n=21$; *B. curtipendula* $2n=28$, 35, 40, 42, 45, 56, 70, and 98; *B. eriopoda* $2n=21$; *B. gracilis* $2n=28$, 35, 42, 61, and 77; *B. hirsuta* $2n=21$, 37, and 42; *B. rigidiseta* $2n=35$ and *B. rothrockii* $2n=22$. Six biotypes of blue grama (*B. gracilis*) and 5 of side oats grama (*B. curtipendula*) were described and studied cytologically. No definite relationship between biotype and chromosome complements was found. Differences in total chromosome length per complement were found both within and between the several ploids but these differences were not correlated with the several biotypes. Prochromosomes were found to be common in the resting root tip cells of blue grama and side oats grama and the limited observations indicated that these were of the same number as the somatic chromosomes.—Jess Fults.

14126. JENSEN, HENRY WILHELM. (*Asheville Farm Sch., Swannanoa, N. C.*) The abnormal meiosis of *Benzoin aestivale* in relation to the origin of sex chromosomes. *Amer. Nat.* 76(762): 109-112. 1942.—Meiosis in microsporogenesis of *B. aestivale* displays 12 haploid chromosomes, one of the medium sized of which appears to consist of unequal units. One element seems to be smaller than the other, of slightly different shape, and different in behavior. As a result of the elimination of the larger member of the heterochromosome pair from the daughter nuclei of about 50% of the PMCs, the largely perfect pollen is of 2 sorts, about 50% having 12 chromosomes, and 50% having 11 chromosomes. The latter type appears to be non-functional. Together with other circumstances there seems to be good reason to regard this meiotic irregularity as one stage in the evolution of so-called sex chromosomes, without implying a determining sex-determining function as a result of their distinct and continued presence in the ♂♂ and ♀♀ of a given species.—H. W. Jensen.

14127. LONGACRE, DOROTHY J. (*Fordham U.*) Somatic chromosomes of *Acomitum noveboracense* and *A. uncinatum*. *Bull. Torrey Bot. Club* 69(2): 235-239. 3 fig. 1942.—The somatic chromosome number of *A. noveboracense* and *A. uncinatum* was detd. as 16 ($n=8$). Both spp. have 8 distinct chromosomes and one chromosome from each sp. has a satellite. The idiograms of each sp. are compared as to chromosome size and shape.—D. J. Longacre.

14128. PATTERSON, ELIZABETH KNIGHT. (*Bryn Mawr Coll.*) The photodynamic action of neutral red on root tips of barley seedlings. II. Abnormalities of cells and tissue. *Amer. Jour. Bot.* 29(2): 109-121. 44 fig. 1942.—Seedling roots of *Hordeum vulgare* were irradiated for 1 hr. in sunlight in a 1:75,000 soln. of neutral red and subsequently grown in water in the dark. Control roots irradiated in distilled water and control roots grown in dye soln. in the dark showed no abnormalities. Sections of the exptl. roots fixed at various intervals after irradiation showed a rapid fall in the frequency of cell division, the roots becoming mitosis-free after 7 hrs. Abnormalities of nuclear division occurring before the mitosis-free interval consisted of pycnosis, formation of bridges in anaphase, and pseudoamitosis. The stalk-thinning end stage of pseudoamitosis was the most frequent. Roots in which division started again showed no nuclear abnormalities. The vacuolization of the dermatogen cells occurring immediately after irradiation was followed by a spread of the reaction throughout the meristem region until at 23 hrs. after irradiation the entire root tip contained cells typical of the zone of elongation. Sections showed that the marked ageotropic bending seen in roots 20-70 hrs. after irradiation was caused by a lack of elongation or contraction of the side of the root facing the sun, which was photodynamically injured as shown by the large number of dead cells on the concave sides of the bent roots. Branch roots formed in the bend of the main roots and grew toward their convex side. No branch roots were seen in uninjured controls. All the abnormalities mentioned are similar to some of the effects found by others after X-irradiation of plant tissue, as well as after other stimuli.—E. K. Patterson.

14129. POLIAKOVA, T. F. [Effect of high and low temperature upon chiasma formation in *Allium cepa* L.] *Comp. Rend. (Doklady) Acad. Sci. U. R. S. S.* 27(6): 594-597. 2 fig. 1940.—The character of dependence of chiasma formation on temp. in onion was found to be expressed by a bimodal curve similar to that obtained for insects. From this resemblance it is assumed that temperature exerts a direct influence on the physicochemical properties of the chromatids, and that these are evidently similar in plants and animals.—Courtesy *Exp. Sta. Rec.*

14130. RAO, L. N. Cytology of *Hibiscus trionum* L. *New Phytol.* 40(4): 326-335. 33 fig. 1941.—The chromosome number of *H. trionum* is 28. There are 15 bivalents at meiosis; 6 of the somatic chromosomes bear trabants. The telophase nucleus possesses 6 nucleoli. In prophase 6 nucleolar attachments are observed. During meiosis, secondary association of bivalents at metaphase I and of univalents at metaphase II results in a high % of grouping into threes. Evidently *H. trionum* is a secondarily balanced polyploid, partly tetraploid and partly hexaploid.—L. N. Rao.

14131. ROSTAND, JEAN. La polyploïde expérimentale. *Rev. Sci. (Paris)* 79(3): 157-162. 5 fig. 1941.—A summary of researches in *Petunia*, *Vinca rosea*, *Linum usitatissimum*, and wheat. 11 ref.—H. Simons.

14132. SAURA, FULGENCIO. Cariología de algunas especies del género *Paspalum*. [A nuclear study of some species of *Paspalum*.] *Univ. Buenos Aires Fac. Agron. y Vet. Inst. Genética* 2(3): 41-48. 1941.—Among 11 spp. there were found 2 diploids, 6 tetraploids, 1 hexaploid, and 2 octoploids (1 doubtful). The av. diams. of the microsporocytes, their standard deviations, their differences in various spp., and their relation to chromosome numbers are discussed. The aceto-carmine method was used on pollen mother cells taken from inflorescences just before flowering.—From auth. summ. by F. G. Wallace.

14133. SIMONET, MARC, et MARCEL GUINOCHEZ. Sur l'apparition dans les tissus végétaux de cellules polyploïdes sous l'influence des vapeurs de paradichlorobenzene. *Compt. Rend. Soc. Biol.* 130(11): 1057-1060. 1939.—The cytological and morphological effect of commercial paradichlorobenzene on *Linum usitatissimum* was studied. Radicles of flax seedlings kept in Petri dishes 10 cm. in diam. containing 0.01 g. of sublimated or crystallized chemical did not exceed 0.5-0.6 cm. in length on the 5th day, and showed tumefaction; radicles of control seedlings were then filiform, 3-4 cm. long. In the dwarfed radicles, the majority of the cells in the cortical parenchyma, epidermis and central cylinder had multiple nuclei; mostly they were binucleate, sometimes trinucleate or quadrinucleate. The cells were often clumped; cell wall formation had sometimes been inhibited. Supernumerary daughter cells occurred. Mitoses arrested in metaphase were seen (either 2, 3, or 4 nuclei in metaphase within the cell, or figures showing $2n=60$ or 90, as opposed to $2n=30$ in normal flax tissue). Nuclei with 2 nucleoli and other anomalies were present. Observations on the cellular toxic effects of toluene, phenylacetamide and some of its derivatives, phenyl-, phenylmethylmalonyl-, and diethylmalonyl-urea, morphine, codeine, ephedrine, and phenanthrene are briefly mentioned.—S. Simons.

14134. WALTERS, JAMES L. (*U. California, Berkeley*) Distribution of structural hybrids in *Paeonia californica*. *Amer. Jour. Bot.* 29(3): 270-275. 6 fig. 1942.—A study of structural hybrids in *P. californica* ($n=5$) has revealed structural homozygotes (5_{rr}) and a complete series of interchange heterozygotes, including 0₄, 0₆, 2₀4, 0₈, 0₆+0₄, and .10. This is the 2d complete series now known, paralleling the situation in *Oenothera* subg. *Onagra*. In addition, recognition of 2 of the 5 chromosome pairs in meiosis has made it possible to show differences in the constitution of rings of a given size, and to show alterations in chromosome morphology through unequal translocation. There are certain regularities in the geographic distribution of the various types: a tendency is noted for pair-forming plants and small-ring types to be more abundant near the center of the range of the species, and for the larger rings to be more numerous near the periphery. Tentative suggestions are advanced to explain these regularities, and comparisons are made between the distributional features of *P. californica* and those of *Onagra*. It is suggested from cytological and distributional evidence that there is no particular survival value associated with the complete ring in *Paeonia*, in contradistinction to *Onagra*, but that the extensive structural hybridity found is due to a combination of cytological circumstances favoring frequent interchange, added to the fact that the plants are long-lived perennials in which even large reduction of fertility does not significantly reduce reproductive ability.—J. L. Walters.

14135. WANG, D. T. Karyokinetic study on *Sophora japonica* L. *Bull. Fan Mem. Inst. Biol. (Bot.)* [Peiping] 10(4): 231-234. 1 pl. 1940.—The nucleus is of the euchromocenter type with 28 euchromocenters and chromosomes. The nucleolus usually disappears at the end of the prophase, but may divide amitotically and exist in the form of chromatic globules at the poles until telophase.—E. H. Walker.

14136. WU, SU-HSUEN. Cytological studies on *Spiromenia fragrans* Lindl. and certain other Commelinaceae. *Papers Michigan Acad. Sci. Arts and Lett.* 27: 117-135. 10 pl. 1941(1942).—*S. fragrans* ($n=6$) has 3 pairs of chromo-

omes with submedian and 3 with subterminal fibre attachment, one of the latter bearing satellites. *Neodonellia grandiflora* ($n=16$) has 2 submedian pairs and 14 subterminal pairs, with 3 of these bearing satellites. *Rhoeo discolor* ($n=6$) has 3 pairs subterminal and 3 with the attachment $\frac{1}{3}$ from the end. In *Spironema* the chromosomes are quadruple in premetaphase, the leptotene being double in meiosis. Division of the chromonema is in premetaphase I. The chromonemata at metaphase I comprise 4 double-coiled spirals. In the 2d meiotic division new spirals are formed and the old ones uncoil so that at metaphase II only minor spirals appear. Nucleolar origin is descr. and each chromosome may share in it, the aggregation occurring at the fibre-attachment point. The incipient nucleolus may migrate along the chromosome.—W. R. Taylor.

ANIMAL

14137. BUCK, JOHN B. (U. Rochester.) Micromanipulation of salivary gland chromosomes. *Jour. Heredity* 33(1): 3-10. 13 fig. 1942.—From chromosomes isolated after treatment of the gland with osmic acid vapor it was ascertained that: the chromosomes can be stretched to twice their original length without permanent deformation, and to over 4 times without breaking; most of the elongation occurs in the inter-band regions; breakage occurs straight across the chromosome at right angles to the long axis; there are indications of a volume increase during stretch; during elongation, diagonal and criss-cross striations appear in the inter-band regions, and in some instances these can be seen to have been formed by the apposition of the walls of the vesicles of an originally honeycomb-like structure, indicating that they are artifacts. No evidence of any regular longitudinal differentiation was obtained in attempts to "shred" chromosomes, and to separate synapsed homologs. The elasticity and certain other properties of the chromosomes suggest a tentative comparison with fibrous proteins.—J. B. Buck.

14138. CAPPE de BAILLON, P. L'embryogénie des monstres doubles de phasmes. *Bull. Biol. France et Belgique* 74(3): 197-248. 11 fig. 1940.—In Phasmidae the dorsal area of the egg corresponds to the micropylar apparatus. At the moment of egg-laying the germinative vesicle is situated on the surface of the vitellus on the ventral side of the egg. Its chromosome number before the maturation divisions is inconstant. Polar globules are not extruded. The ensemble formed by superficial nuclei, vitellocophages and the thin layer of liquefied vitellus constitutes the formation center of embryonic blastoderm. The egg deprived of micropyles has no formator center; that with 2 superposed micropyles in the same meridian plane (*Menexenus*, *Baculum*, *Clonopsis*) or that with 2 distinct or fused micropyles (*Carausius*) may possess 2 formator centers. About the 5th or 6th day embryonic blastoderm commences its development. The normal anlage is V-shaped measuring 490μ (height) by 442μ (breadth). Usually on the 25th day the embryo is constituted. The differentiator center is located on the niveau of the 1st segment. Its activity is exerted particularly in backward-forward direction. This statement is the key to the formation of double monsters. At the moment of rotation the norm. 25- to 30-day-old embryo passes from the dorsal to the ventral side of the egg pivoting on 180° from the left to the right on the 2d thoracic segm. Because of the particular flattening of the monstrous egg, which is compressed more dorsoventrally than laterally, undoubtedly a fair number of double embryos only accomplish a rotation of 90° . They remain immobilized in the meridian plane parallel to the surface bearing the micropyles, i.e., the dorsal side of the egg. Hatching of double larvae like that of normal ones is preceded by 1 moult. In Phasmidae there is no cervical ampulla; nevertheless, longitudinal rupture of the skin is, as in all Orth. studied, brought about between head and prothorax by pressure of air and hemolymph; the skin remains in the egg. Moulting of larvae bearing uneven supernumerary appendages is difficult and impossible in those larvae having opposed or distinct heads and, in addition, one or more pairs of legs.—H. Simons.

14139. FANKHAUSER, GERHARD. (Princeton U.) The frequency of polyploidy and other spontaneous aberrations of chromosome number among larvae of the newt, *Triturus*

viridescens. *Proc. Nation. Acad. Sci. U. S. A.* 27(11): 507-512. 1941.—Of 1074 larvae examined by the tail-tip method (amputation of tail-tip and mounting), 1056 were diploid, 3 triploid, and the remainder showed various types of polyploidy. In *T. pyrrhogaster*, 3 triploid and 1 haploid specimens were found among 273 larvae. In 134 larvae of *Eurycea bilineata* 13 triploid and 2 tetraploid individuals were found.—R. A. Mutikowski.

14139A. GATES, R. RUGGLES. (U. London.) Some observations regarding the nucleolus and cytoplasm in living marine eggs. *Biol. Bull.* 82(1): 47-51. 1942.—The nucleoli and cytoplasm of the eggs of several marine animals were studied, including *Asterias*, *Macra*, *Chaetopterus* and *Arbacia*. In living eggs the nucleolus is generally in 2 parts, the outer one being more soluble in fresh water than the inner globule (nucleolinus). Tests for lipoids in the nucleoli gave negative results. When living eggs are treated with Schiff's reagent, without hydrolysis, the cytoplasm quickly or slowly turns magenta, probably owing to acetalphosphatids present. In crushed eggs of *Chaetopterus* the cytoplasmic granules, which are of various sizes, are colored magenta to different degrees, some granules remaining unstained while the smallest granules stain most intensely. The aldehyde substance concerned is soluble in alcohol. There was no evidence of phospholipids in the nucleolus. Eggs and oogonia of *Fucus* do not give the Feulgen reaction without hydrolysis, but if subsequently exposed to air the thallus turns purple. On heating in Feulgen, the eggs and the colorless medullary strands turn pink and magenta bodies appear in the medullary strands.—R. R. Gates.

14140. GRESSION, R. A. R. A study of the cytoplasmic inclusions during maturation, fertilization and the first cleavage division of the egg of the mouse. *Quart. Jour. Microsc. Sci.* 83(1): 34-59. 2 pl., 3 fig. 1941.—Ova were fixed at times varying from 5-43 hrs. after copulation. Ovulation occurs at either the stage of the 1st or 2d maturation division. The 1st cleavage takes place between 21 and 28 hrs. after pairing. The mitochondria are granular and are collected into small clumps. Few are eliminated in the polar bodies. The mitochondria are transmitted with approximate equality between the first 2 blastomeres. The Golgi elements are fairly evenly distributed between the first 2 blastomeres. The sperm middle-piece enters the egg. The mitochondria of the middle-piece spread out through the cytoplasm of the fertilized egg and undergo fragmentation. The Golgi material of the sperm middle-piece fragments. Granular mitochondria were identified in the blastomeres of the two-cell stage. The Golgi elements are scattered through the cytoplasm and undergo fragmentation.—R. A. R. Gresson.

14141. HINTON, TAYLOR, and K. C. ATWOOD. (Columbia U.) Terminal adhesions of salivary gland chromosomes in *Drosophila*. *Proc. Nation. Acad. Sci. U. S. A.* 27(11): 491-496. 1941.—In end-to-end adhesions of salivary gland chromosomes of *D. melanogaster* and *D. obscura* it is found that the combinations of chromosomes in adhesions are non-random and that the individual chromosomes behave alike within any one strain. Frequency of adhesion involving the X-chromosome is lower in ♂♂. Several factors have been eliminated as possible causes of the selectivity of terminal adhesions; the hypothesis seems most plausible that the non-randomness is due to a number of specific factors located at the tips, plus a non-specific tendency to adhere, influenced by chromosome length.—R. A. Mutikowski.

14142. HUGHES-SCHRADER, SALLY. (Columbia U.) The chromosomes of *Nautococcus schraderae* Vays, and the meiotic division figure of male llaveiine coccids. *Jour. Morph.* 70(2): 261-296. 3 pl. 1942.—In this llaveiine coccid the precocious formation of half spindle fibers by the late diakinetic spermatocyte chromosomes permits a demonstration of the diffuse nature of the spindle-fiber attachment which is continuous along the length of the chromosome. It is thus possible to homologize the unique meiotic spindle of llaveiines with the ordinary hemipteran type. The differences involve the dispersed nature of the pole in the former, and the relative timing of polarization and half spindle formation. The diffuse spindle-fiber attachment

permits an early and complete resolution of chiasmata in the tetrads, and a uniform separation of chromatids and half chromatids in metaphase and anaphase stages. The somatic and meiotic chromosomes are clearly 4-parted at metaphase, and 2-parted at anaphase and telophase. In the 1st meiotic anaphase the separating chromatids move poleward at different rates, frequently resulting in the formation of linear aggregates. Supernumerary chromosomes are found in many of the animals studied. Their presence and number vary within the individual. They show no meiotic pairing, divide equationally at the 1st division and are distributed at random at the 2d. Elimination and irregular distribution of supernumeraries are frequent in embryos and occur as late as the last spermatogonial division. It is brought about by the suppression of spindle fiber formation, the vesiculation, and consequent elimination of supernumeraries.—Auth. (courtesy *Wistar Bibl. Serv.*).

14143. ITO, TOSHIO. (Keio U., Tokyo.) Über den Golgiapparat und die Mitochondrien der Spermatogonien sowie Spermatozyten des Menschen, nebst Bemerkungen der Riesenspermatogonien. *Cytologia* 11(3): 436-451. 1941.—Five testicles were studied. The nucleus measured 6.8-5 μ . The Golgi apparatus was in a diffuse form, the elements of which were externally osmophilic and internally osmophobic. The mitochondria were granular. The nucleus measured 8.5-9.5 μ and contained a large nucleolus. The Golgi apparatus had a complex form forming there a Golgi-idiosome complex. The mitochondria were granular. In the seminiferous tubules, giant cells are found which will probably give rise to spermatogonium. These giant cells divide again into mononucleate and polynucleate giant cells. The size of the nucleus in the mononucleate giant cells measures 9.5-16 μ . The number of nuclei in the polynucleate giant cells is 2-6.—K. C. Atwood.

GENETICS

Editors: ORLAND E. WHITE, *Plant*; SEWALL WRIGHT, *Animal*

(See also Entries 14112, 14118, 14119, 14121, 14122, 14123, 14131, 14132, 14133, 14141, 14489, 14529, 14588, 14657, 14675, 14813, 14821, 14824, 14879, 14880, 15054, 15223, 15246, 15247, 15254, 15255, 15256, 15357, 15402, 15431, 15463, 15467, 15469, 15666)

PLANT

14144. ANDRÉS, JOSÉ MA., y PABLO C. BASCIALLI. Caracteres hereditarios aislados en maices cultivados en la Argentina. [Heredity characters of cultivated maize in Argentina.] *Univ. Buenos Aires Fac. Agron. y Vet. Inst. Genetica* 2(1): 3-26. 25 fig. 1941.—92 hereditary characters isolated from cultivated corn belonging to various export types are listed and briefly described. All these characters, which correspond to 19 distinct types of mutations, were found segregated in the F₂, except 2 which appeared as spontaneous mutations in material being studied and another 2 which were found directly in wild corn. Some which are of special interest because they probably include new genes are: seedlings with irregular white spots, yellow plants, leaves with chestnut colored veins, wrinkled seed, and waxy endosperm.—F. G. Wallace (tr. from auth. abst.).

14145. COOPER, D. C., and R. A. BRINK. (U. Wisconsin.) The endosperm as a barrier to interspecific hybridization in flowering plants. *Science* 95(2455): 75-76. 1942.—The primary cause of hybrid seed collapse is weak growth of the endosperm. The subnormal development induces modifications in the associated maternal tissues, which in turn react unfavorably upon the endosperm. The latter becomes starved, the cells break down and the seed collapses.—E. J. Umberger.

14146. DALE, ERNEST E. Inheritance of two factors affecting anthocyanin distribution in flowers of Petunia. *Papers Michigan Acad. Sci., Arts and Lett.* 27: 3-6. 1 pl. 1941 (1942).—The factor pale-corolla largely inhibits anthocyanin production in the flowers of petunia and shows recessive monogenic inheritance. A 2d factor, pale-veined, occurred in a variegated strain of petunia called "stippled" (unpublished). This factor produces pale veins around the throat margin in stippled flowers. In the stippled stock, pale-veined gave recessive monogenic segregation when crossed with dark-veined. But the stippled variegation is unstable and produces some normal flowers. In 16 such plants the normal flowers were in all cases dark-veined and the stippled flowers pale-veined. Chimera flowers were dark-veined in the normal sectors and pale-veined in the stippled sectors. Since "stippled" is recessive to normal and pale-veined is recessive to dark-veined, it is suggested that pale-veined may be detd. by 2 pairs of complementary recessive genes.—E. E. Dale.

14147. GOODWIN, R. H. (U. Rochester.) The selective effect of climate on the flowering behavior of *Solidago sempervirens* L. *Proc. Rochester Acad. Sci.* 8(1): 22-27. 1941.—Comparison of flowering dates of *S. sempervirens* at various latitudes showed that the species flowers progressively later as one passes from n. to s. Since plants from different parts of the range flowered at different times even when grown at the same latitude, the author concluded that the species contains genetically distinct strains geographically segre-

gated by physiol. requirements for floral initiation.—A. H. Brown.

14148. GUDKOV, A. N. (Formation of pigment in glumes and kernels of wheat.) *Compt. Rend. (Doklady) Acad. Sci. U. R. S. S.* 27(8): 841-845. 6 fig. 1940.—Since plants of most widely different genetic organization can be easily separated into their respective groups and varieties on the basis of pigmentation, this character is important to physiologists and breeders. The author presents phenological data on the appearance of pigment in a number of vars. of spring and winter wheats with the technic of determination.—Courtesy *Exp. Sta. Rec.*

14149. HÜBER, L. L., and G. H. STRINGFIELD. (Agric. Exp. Sta., Wooster Ohio.) Aphid infestation of strains of corn as an index of their susceptibility to corn borer attack. *Jour. Agric. Res.* 64(5): 283-291. 2 fig. 1942.—Inbred lines of corn and their hybrids exhibit heritable differences in susceptibility to the corn leaf aphid (*Aphis maidis*). Susceptibility to the corn leaf aphid, a sucking insect, was measurably correlated with susceptibility to the corn borer (*Pyrausta nubilalis*), a chewing insect. Preliminary classifications of breeding material as to susceptibility to the corn borer might be made on the basis of aphid populations.—Authors.

14150. JOHNSON, I. J. Cross fertility relationships of "Golden Annual" sweet clover with common species of *Medicago*. *Jour. Amer. Soc. Agron.* 34(3): 259-262. 1942.—Golden Annual, a var. of yellow-flowered sweet clover, was obtained from a single yellow-flowered plant in seed introduced from Mongolia. From a series of crosses between Golden Annual and vars. of *M. alba*, *M. officinalis*, and *M. suaveolens* the cross-fertility relationship as measured by seed setting and seed wt. indicates that this var. is an annual form of *M. suaveolens*. In the F₁, the annual form is dominant over the biennial in the same species. More detailed data from subsequent generations pertaining to the homology of the genes for annual growth habit in interspecific crosses will be reported later.—Auth. summ. and concl.

14151. LEONARD, WARREN H. Inheritance of reduced lateral spikelet appendages in the Nudihaxtoni variety of barley. *Jour. Amer. Soc. Agron.* 34(3): 211-221. 2 fig. 1942.—Nudihaxtoni, a var. of barley classified as *Hordeum intermedium*, has fully fertile but awnless lateral spikelets. The lemma of the central spikelet is long-awned. This var. was found to be a 6-rowed barley which differed from the ordinary 6-rowed vars., classified as *H. vulgare*, by a factor for the reduction of lateral spikelet appendages, i.e., awns in this case. The normal vs. reduced lateral spikelet appendage (*lr*, *lr*) factor pair is inherited as a single-factor-difference. Normal was dominant over reduced appendages (awns or hoods) in the crosses reported. Normal appendages on the lateral spikelets occur only in the presence of the factor

for 6-row (*vv*). The interrelationship of orange seedlings (*Or*, *or*), located in group I, indicates a linkage with a recombination value of $38.58 \pm 1.20\%$ as detd. from the F_2 genotypes. The normal vs. reduced factor pair was found to be inherited independently of factors known to be located in the other 6 linkage groups.—*W. H. Leonard.*

14152. McMICHAEL, SCOTT C. (*U. S. Cotton Field Sta., Shafter, Calif.*) Occurrence of the dwarf-red character in upland cotton. *Jour. Agric. Res.* 64(8): 477-481. 1942.—A new genetic character, "dwarf-red," in the Acala var. of upland cotton *Gossypium hirsutum* originated as a chimera on an otherwise normal green plant. The vegetative parts of dwarf-red Acala are dark red, the fruiting parts such as petals and bolls are normal in appearance. Dwarfing is due to decrease in both the number and length of internodes. Dwarfing and red-plant coloration are completely associated. "Dwarf-red" (dwarfing and red plant color) is due to a single factor difference.—*S. C. McMichael.*

14153. PETO, F. H., and G. A. YOUNG. (*Nat. Res. Lab.*) Hybridization of *Triticum* and *Agropyron*. VII. New fertile amphidiploids. *Canadian Jour. Res. Sect. C. Bot. Sci.* 20(3): 123-129. 1942.—Fertility was induced by means of colchicine treatments in sterile intergeneric hybrids of the following wheat vars. crossed with *Agropyron glaucum*; *T. vulgare* vars. Mosida, Ruby, Milturum, and Kharakov, *T. durum* vars. Mindum and Black Persian, *T. turgidum*, *T. dicoccum* var. Vernal and *T. pyramideum*. 3 methods of applying colchicine were compared; the "capsule" method was found to be the most economical and effective.—*Auth. abst.*

14154. RAPTOPOULOS, T. Pollen-tube growth studies in cherries. *Jour. Genetics* 42: 73-89. 1941.—Investigation of the position regarding compatibility between cherry spp. with different chromosome numbers was undertaken to assist in elucidating the working of the incompatibility mechanism in general. Studies of pollen-tube growth on diploid, triploid and tetraploid styles with the same range of pollen have shown:—The tetraploid cherry *Prunus cantabrica* is self-compatible. Self-pollination of triploids fails entirely, in part because of the high sterility of the pollen and in part from the deformation of the styles and the presence of opposing factors for incompatibility. The style as well as the stigma takes an active part in resisting incompatible pollen tubes. Almost all the cross-pollinations examined are partially compatible, but the proportion of effective pollen tubes ranges considerably. The growth rate of the compatible pollen tubes accelerates on the third and fourth day after pollination, whilst that of the incompatible tubes is greatly decreased and in many cases may be completely arrested in the stylar tissue at this time. Cross-pollinations between diploids and tetraploids are favored when the tetraploid is used as the female parent. The complexity in behavior increases with polyploidy and hybridity.—*Courtesy Hort. Absts.*

14155. SINGLETON, W. RALPH. New corn hybrids. *Canning Age* 22(12): 559-560. 1941.—A general report on new corn hybrids with descriptions of a number of Connecticut Expt. Station hybrids. The earliest hybrid that may be suitable for the canner is Carmelcross (P39XC13). It matures about 3-4 days later than Marcross and about 10 days before Golden Cross Bantam. As yet it has not been tried for canning but seems worthy of a trial. Another hybrid that has excellent table quality is P39XC25. It is a day or two earlier than Golden Cross Bantam, has a more slender ear, and an extremely long husk, affording some ear worm protection. Only exptl. lots have been canned. Nothing better than Golden Cross exists in its season. One hybrid in this season that may have possibilities for canning is P39XC81. Hybrid C31XC87 is described for the season 3-5 days later than Golden Cross. It has been tested throughout the northeast and has given good results as a table var. but has not been tried for canning. Other hybrids of this type are being developed. The latest hybrid is Golden Stowell's C65XC53 that is about a week or 10 days later than Golden Cross. The canning quality has not been tested. The article ends with a commentary on sweet corn quality and points out that a chemist's help to work out a method for testing flavor would help the sweet corn breeder.—*O. A. Reinking.*

14156. SMITH, LUTHER. (*U. Missouri.*) Hereditary

susceptibility to x-ray injury in *Triticum monococcum*. *Amer. Jour. Bot.* 29(2): 189-191. 1 fig. 1942.—A mutant in einkorn wheat was found which is more severely injured by X-ray treatment of the dormant seeds (4,000-20,000 r-units) than other mutants or normal vars. tested. In one trial the germination of a normal line was reduced 12% by 20,000 r while the susceptible was reduced 84%. The injury exhibits itself in greater flecking on the leaves, slower growth, and death from smaller doses than are required to produce similar effects in non-susceptible seeds. Preliminary tests indicate that the susceptibility is inherited as a simple recessive character, the factor has no effect on mutation rate and does not reduce the ability of seeds to withstand heat injury, and the moisture content of the seeds and the size of the chromosomes in the susceptible line are normal.—*Luther Smith.*

14157. STEVENSON, F. J. (*U. S. Hort. Sta., Beltsville, Md.*) Potato breeding, genetics, and cytology: Review of literature, 1940. *Amer. Potato Jour.* 18(11): 317-329. 1941.—Some of the subjects discussed in the papers reported are: breeding methods; tuber quality; immunity in the field to viruses X, A, B, and C, and resistance in the greenhouse and field to Y; evidences of resistance to viroid leafroll; resistance to tuber rot initiated by late blight; the production of early scab-resistant varieties; resistance to fusaria in the field; resistance to potato wart; stoloniferousness; graft hybrids; colchicine treatments; cytological studies; and resistance to animal parasites.—*F. J. Stevenson.*

14158. WHALEY, W. G., and C. Y. WHALEY. (*Columbia U.*) A developmental analysis of inherited leaf patterns in *Tropaeolum*. *Amer. Jour. Bot.* 29(3): 195-200. 1942.—A study was made of developmental patterns of leaves of *T. majus* var. Golden Gleam and *T. peltophorum* var. *fimbriatum* and hybrids derived from them. Two genes *L*- and *U*-*u*, in epistatic relationship, control the development of the patterns. *U* produces greater intensity of division in certain areas very early in development. *L* functions principally in controlling the amount of cell expansion. *L* and *U* together also have a complementary effect upon cell expansion. The shape pattern is laid down by early differential cell division. Final leaf shape is determined by the extent to which cell enlargement develops the original patterns.—*W. G. Whaley.*

ANIMAL (EXCEPT MAN)

14159. BARTO, ELIZABETH. Independent inheritance of certain characters in the deer mouse, *Peromyscus maniculatus*. *Papers Michigan Acad. Sci., Arts and Lett.* 27: 195-213. 1941 (1942).—Tests for linkage showed independent inheritance between the following pairs of characters in the deer mouse: albino and dilute, albino and postjuvenile nude, albino and waltzing (*bairdii* type); hairless and dilute, hairless and ivory, and dilute and ivory. The character dilute was established as a marker for a previously undesigned chromosome.—*Elizabeth Barto.*

14160. CASTLE, W. E., and P. B. SAWIN. Genetic linkage in the rabbit. *Proc. Nation. Acad. Sci. U. S. A.* 27(11): 519-523. 1941.—Five linkage groups have been demonstrated in the rabbit. These are genetic markers of 5 of the 22 chromosome pairs. Diagrams of the 5 linkage maps are given.—*Authors.*

14161. CHERIAN, M. C., and V. MAHADEVAN. (*Agric. Res. Inst., Coimbatore, India.*) Genetical Studies of Eri silkworms—(*Attacus ricini Boisd.*) *Current Sci.* 10(9): 412. 2 fig. 1941.—A consignment of silkworms contained 2 types, one with prominent black spots, the other without spots. Moths bred from these were crossed. In the F_2 and back crosses spottiness proved to be a simple Mendelian dominant.—*R. A. Muttikowski.*

14162. DOBZHANSKY, TH., and B. SPASSKY. Intersexes in *Drosophila pseudoobscura*. *Proc. Nation. Acad. Sci.* 27(12): 556-562. 5 fig. 1941.—Diploid intersexes in *D. pseudoobscura* are described. Most of them have 2 sets of genital ducts and external genitalia but only 1 pair of gonads. One of the sets of the ducts and the genitalia is almost always more ♀-like and the other more ♂-like. The genetic causation of the intersexuality in this case is most probably a single dominant gene transforming diploid ♀♀ into intersexes. The normal allele of this gene need not be

regarded as the single gene for maleness nor even as being involved in any way in the mechanism of sex determination.

—Authors.

14163. FRYER, HOLLY CLAIR. (*Iowa State Coll.*) An analysis of group differences arising from a Poisson distribution of observations obtained from irradiation experiments. *Iowa State Coll. Jour. Sci.* 16(1): 49-51. 1941.—Specific, visible gene mutations (or deletions) were produced in *Drosophila melanogaster* by irradiation at 3 wave lengths of x-rays. The genes observed were located on 3 chromosomes. The frequency of such mutations follows a Poisson distribution. A χ^2 -square analysis of such data is safer and easier than a large-sample-theory analysis in which observed differences in mutation rate are measured against standard errors. The additive property of χ^2 -square enables one to accumulate evidence in a field where very small observed numbers characterize the research. With 1 or 2 possible exceptions, the mutation rates of the loci studied were essentially alike. No evidence of different rates of mutation on the different chromosomes was found; nor was there any evidence against the hypothesis that mutation rate is proportional to the dosage of radiation applied. When wave lengths were adjusted for absorption, no significant differences in mutation rate remained. Data from Timofeef-Ressovsky and from Patterson were analyzed as illustrations of method.—H. C. Fryer.

14164. LEBEDEFF, G. A. A study of intersexuality in *Drosophila virilis*. *Genetics* 24(4): 553-586. 5 pl., 2 fig. 1939.—The intersexes were found to have a normal diploid chromosome complement and to be homozygous for the recessive factor ix^m , located between the factors G and sv on the 3d chromosome. This factor has no effect on $\delta\delta$, but $\Omega\Omega$ homozygous for it are converted into sterile $\delta\delta$. Two or more incompletely dominant modifiers may give various degrees of intersexuality; one or more dominant suppressors if ix^m are present in certain stocks. Adult intersexes vary from Ω -like to nearly δ -like in genitalia and gonad structure. The genetic evidence that the intersexes are genetically Ω , and the morph. evidence that the organs determined latest in development are the ones most often modified toward maleness suggest that the intersexes begin development as $\Omega\Omega$ and after a certain turningpoint continue development as $\delta\delta$. This suggestion is supported by histological studies of larval and pupal gonads. The gonads of intersexes begin as ovaries; in Ω -like intersexes development of the ovary is merely retarded; in δ -like forms, ovaries are modified into testis-like organs. Hermaphrodites result from development of the δ sex organs while the Ω organs continue developing as well; the ovaries in these cases are transformed into ovotestes. Germ cells in modified ovaries are converted into spermatocyte-like cells. In all intersexes, gametogenesis is abortive.—K. S. Brehme.

14165. ROUBAUD, EMILE. Phénomènes d'amixie dans les intercroisements de Culicides du groupe pipiens. *Compt. Rend. Acad. Sci. [Paris]* 212(7): 257-259. 1941.—In the cross, $\delta C. pipiens \times \Omega C. fatigans$, 2 out of 5 batches of eggs were sterile or produced only larvae that died before hatching. From the 3 other batches about 100 larvae hatched, only 55 of which reached complete development. In the hybrid, $\delta C. fatigans \times \Omega C. pipiens$, 16 out of 17 batches of eggs were sterile. Analogous phenomena of amixie were observed by intercrossing biotypes of *C. pipiens*. Thus in $\delta C. pipiens$ from Normandy $\times \Omega C. pipiens$ *autogenicus* from Tunisia 3 out of 5 batches of eggs were infertile; in the reverse combination the 3 batches obtained were all infertile. 12 out of 13 batches of eggs of δ *autogenicus* from Toulon $\times \Omega C. pipiens$ *herbericus* from Algeria were

totally sterile with a large proportion of larvae dying before hatching. From 6 batches of eggs of $\Omega C. pipiens$ *autogenicus* from Tunisia $\times \delta$ from Paris 3 were sterile while 2 out of 5 batches of eggs of $\Omega C. pipiens$ *autogenicus* from Algeria $\times \delta$ from Paris were partially or totally infertile.—H. Simons.

14166. SHULL, A. FRANKLIN. (*U. Michigan*) The mechanism through which light and heat influence genetic factors for wing development in aphids. *Jour. Exp. Zool.* 89(2): 183-195. 1942.—Continuous light suppressed wings in half the offspring in 3 days; high temp. accomplished the same result in 1 day. The higher the temp., and in earlier experiments the more intense the light, the more quickly wings were suppressed. Aphids reared in alternating light and darkness a long time (to make their offspring winged) must be treated a longer time with continuous light to suppress wings, than is necessary if the intermittent light is applied a short time. If aphids whose offspring are all winged, because of intermittent-light treatment, are first subjected to continuous light (of too short duration to suppress wings), the time required by subsequent heat to suppress wings is reduced. This reduction is roughly proportional to the length of time the continuous light is applied. Heat and continuous light together suppress wing production in less time than does heat with intermittent light. These results all indicate that heat and light act through the same mechanism. If wings are suppressed by a high conc. of some substance, that substance is produced under the influence of both high temp. and continuous light. One of these agents may begin the process, the other complete it by starting at the point where the first was discontinued. The change is hastened if both agents operate at the same time.—Auth. (courtesy Wistar. Bibl. Serv.).

14167. SONNEBORN, T. M. (*Indiana U.*) Inheritance in ciliate Protozoa. *Amer. Nat.* 76(762): 46-62. 1942.—A critical review (including some unpublished work) on ciliate genetics, emphasizing observations not readily interpreted by orthodox genetic principles. Nearly all observations on hereditary diversities within a clone are excluded as (a) not clearly within a clone, (b) not clearly hereditary, or (c) not indicative of constitutional diversity. The following appear unobjectionable: (1) Middleton's isolation of diverse lines by selection in clones of *Styloynchia*; (2) Kimball's observation of genetically diverse lines in unstable clones of *Paramecium aurelia*; (3) Sonneborn's observation of the origin of a whole complex of new characters within a clone of *P. aurelia* after regeneration of new macronuclei from single fragments of an old macronucleus. Especially in cases 2 and 3, genic interpretations seem excluded. Recent studies on genic inheritance in *P. aurelia* show that hereditary diversities between clones arising at conjugation and other nuclear reorganization processes, as reported in many older papers, apparently were not due to recombination of genes, because the stocks investigated should have been homozygous as a result of the special type of autogamy that occurs. Hereditary clonal differences in mating type in certain stocks appear not to be due to genic differences in the micronuclei or macronuclei, though these characters are determined in some way by macronuclei (influenced by temp. at the time of their origin from micronuclei). The Dauermodifikationen reported by Jollos and interpreted by him as non-genic in origin are contrasted with the preceding. The foregoing independent lines of evidence all suggest that most hereditary differences in ciliates are due either to mutations occurring with unprecedented frequency and in most improbable ways, or to at present unrecognized non-genic factors.—T. M. Sonneborn.



ECOLOGY

Editors

FREDERICK A. DAVIDSON, *Ecology of Wildlife Management—Aquatic*
 W. L. MCATEE, *Ecology of Wildlife Management—Terrestrial*

ROBERT G. STONE, *Bioclimatology, Biometeorology*

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BIOCLIMATOLOGY, BIOMETEOROLOGY

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14168. ANDERSON, C. N. A representation of the sunspot cycle. *Bell System Tech. Jour.* 18(2): 292-299. 1939. Also *Terrestrial Magnetism and*

Atmospheric Electricity, June 1939.—An analysis of possible harmonic components of sunspot data from 1749 to the end of 1937 was made resulting in a computed curve based on harmonics of a 312-yr. period which not only fitted the above data but also checked the observed years of a maxima and minima back to 1610 A.D. The data were first redrawn with alternate 11-yr. periods above and below the axis so that the maximum-amplitude component became approx. 22 yrs. (22.25 yrs.) instead of the customary 11 yrs. Successive periodograms indicated many of the components

to be harmonics of 312 yrs. which was then assumed to be the fundamental. A substantiation of this 312-yr. cycle was found in a check of maxima and minima from 1923 to date compared with those approx. 312 yrs. earlier. Next in importance to the 22.25-yr. period are 2 periods of 17.3 and 18.4 yrs.—C. N. Anderson.

14169. BELÁK, S. Über die Beziehungen der Temperaturschwankung zu den Todesfällen. *Balneol.* 6(2): 49-57; also in *Deutsch. med. Wochenschr.* 1939(19): 784. 1939.—Correlates Budapest death statistics and temps. by 5-day means for 7 yrs. (1926-32) including 115,000 deaths. Warm spells of 5 days or more cause a rise in the death rate and vice versa with cold spells. Paradoxically death rates are greater in winter than summer, with the rise in deaths delayed by 2-3 months after the fall temp. decrease. This is thought to be due to greater vitamin intake and alkaline balance in summer which raises the vegetative tone by vagus stimulation and decreases sensitivity of the sympathetic system to cold. After winter cold starts (with its less vitamins) the sensitivity to chilling increases and thus indirectly the death rate (an article in *Klin. Wochenschr.*, 1939, discusses this aspect more fully). The effect of front passages is merely the temp. change effect; warm fronts increased deaths 50% of the time and decreased them 41%; cold fronts increased deaths 43%, decreased them 53%.—R. G. Stone.

14170. GEMMILL, CHALMERS L. (Naval Air Sta., Pensacola, Fla.) The effects of lowered barometric pressure on man. *Federation Proc. Pt. II* 1(1): 29. 1942.—An abstract.

14171. HOBBS, W. H. (Ed.) Reports of the Greenland Expeditions of the University of Michigan. II. Meteorology, physiography and botany. 287p. Univ. of Michigan Press: Ann Arbor, 1941. Pr. \$5.—The volume comprises 5 chapters of which the first 3 are devoted in whole or in part to the meteorology and climatology of the western coast of Greenland, where the Michigan expeditions established their camps. The 1st chapter, written by J. E. CHURCH, deals with climate and evaporation in alpine and arctic zones, and with temp. of arctic soil and water. Under the first of these headings the author sets forth in detail the results of > 10 yrs. observa-

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tions on evaporation in the Lake Tahoe region of California, and in the 2nd he presents the data gathered by the expedition of 1927-28 to Camp Michigan, in the Holstensborg district of western Greenland, within a few miles of the arctic circle. Many of the evaporation measurements, the author admits, are subject to considerable error and are not complete enough to give a reliable climatological picture of true average conditions. Nevertheless, the more important effects of evaporation in the hydrological cycle are adequately presented and the more obvious differences and similarities between arctic and alpine régimes pointed out, particularly with respect to the small annual turn-over and the great thriftiness of the arctic cycle where an annual rainfall which would be too small to support agriculture in middle latitudes is sufficient to maintain a superabundance of ground water throughout the year. The observations of water temp. in the arctic during the summer season, it is concluded, show the factors of glacier and ground ice as tending to hold the temp. of the water close to the freezing point, while the strong summer insolation constitutes the greatest heat source for the water. Thus in general smaller pools were much colder than larger ones, and running water colder than lakes. The 2d chapter is written by WILLIAM S. CARLSON, presenting and interpreting the meteorological and aerological records made by the northern division of the 4th Univ. of Michigan Greenland expedition. This expedition occupied a site known as Camp Scott, located some 5 miles from the edge of the inland ice sheet, on a small island in the Upernivik district, making observations over a period from Sept. 1, 1930 until Apr. 27, 1931. Aerological data were computed according to standard Weather Bureau practice, and showed prevailing southwesterly winds at practically all levels above 1500 m. The results are held to corroborate the ideas of atmospheric circulation promulgated by Professor William H. Hobbs that the northern pole of the winds is situated over Greenland. Surface weather observations were also made largely in accordance with Weather Bureau practice, and wind roses were prep'd. for each month, showing prevailing northeasterly winds at and near the surface. Av. temps. during the period of observation were abnormally high at Upernivik, on an island 25 miles to the west of Camp Scott, while the temp. at the camp was also higher than the Upernivik average but below the Upernivik value for the same period. A series of 4 storms is carefully reviewed; it is concluded that Greenland acts as a barrier around one or the other side of which the majority of depressions seem to travel. The 3d chapter deals with the meteorological report of the joint expedition of the Univ. of Michigan and Pan American Airways covering the 2d international polar year, Aug. 1, 1932 to July 31, 1933. The contributor is R. L. BELKNAP, the director of the expedition. The site chosen was also in the Upernivik district, but located some 100 miles to the north of Camp Scott. The aerological records are not as complete as those of the earlier expedition, and show similar conclusions except that prevailing winds from east of south persist to an altitude of about 3 km. at the more northerly point. Surface wind observations seem to have been considerably affected by local topographical control, but valuable data on the distribution through the year of wind, temp., pressure, and cloudiness were obtained. The expedition succeeded in establishing a station on the inland ice far in the interior of Greenland at an elevation of nearly 9,000 ft., where records were kept for more than a month during the summer. These observations clearly showed the predominance of cyclonic control of the weather, with cirrus clouds appearing in 85% of the observations while almost unbroken low clouds predominated over the coast during the same season. Storms which occurred during the yr. are analyzed in some detail in an effort to describe the typical form which storms take in the region and, through comparisons with simultaneous observations at other points on and near Greenland, to determine the influence of the great land mass on the paths taken by the storms. It is concluded that the island acts as a "switch" to direct the storms to one side or the other.—W. E. Howell.

14172. KIDSON, E. The cause of ice ages. Discussion of a paper by G. H. HALLIGAN. *Jour. and Proc. Roy. Soc. N. S. Wales* 71(2): 282-290. 1937-38.

14173. KNOCHE, W. Nota sobre el Rocio. *An. Soc. Cient. Argentina* 127(2): 150-151. 1939.—Dew deposit is of great value to xerophytic plants, a small amt. being equivalent to much more in terms of rainfall. The amt. of dew made available to the plant depends greatly on the structure and nature of the surfaces and protuberances, their color, etc.—R. G. Stone.

14174. KNOCHE, W. Condiciones del calor en la vivienda, en relación al calor externo; Los Valores de calor más elevados en la República Argentina. *An. Soc. Cient. Argentina* 128(1): 25, 30. 1939.—The equivalent temp. (total heat content of air) of the ambient external air and of the air saturated in the respiratory body passages is postulated as being related by the equation TE (internal) = 0.35 TE (external) + 28. The change in total body heat in cal./kg. for various combinations of internal and external TE (by above formula) is given. The TE for hottest weather in Formosa, Paraguay, and Argentina is compared. Knoche has for yrs. argued the value of the TE as a bioclimatic index but the basis for this view is apparently not very sound nor backed up by any exptl. work, so it has not been given much attention. It has the advantage of easy computation, but it seems to the reviewer that it really only gives a measure of the saturation-deficit effect on heat loss via the lungs which is but a small part of the total heat loss from the body, espec. under warm conditions when sweating plays the chief rôle. If the TE is of value anywhere one would expect it to be in the polar regions where heat loss via lungs is a much larger % of the total heat loss. As to the TE as a measure of heat storage in the body due to atmospheric changes, Knoche's formula can hardly be valid. It measures only a strain the atmosphere puts on the body-heat regulation, but the metabolic and heat elimination mechanisms are always counteracting the strains. There is no reason to believe the TE is as good as or any better than the cooling power or the "effective temperature" or "Bradtko's Index," for measuring the physical atmospheric strain.—R. G. Stone.

14175. KNOCHE, W. Condiciones climáticas en relación a las migraciones Melanesio-Polinesias dentro de la Oceania y hacia Sud América. *An. Soc. Cient. Argentina* 128(4): 247-254. 1939.—The spread of Melanesian-Polynesian peoples SE-ward from Asia to the southern and eastern Pacific islands was probably favored by the similarity of climate over the intervening region. In the southern Pacific higher latitudes and southern S. America, however, the cold winters at first must have been difficult for such a tropical people, yet they finally became established in them. The author postulates that they could have migrated into the colder regions during the warm summers and then learned how to prepare for the winters. A table compares the present climates of the E. Indies with Oceania, Chile and New Zealand, by means of various bioclimatic indices; evidently the Polynesians successfully spread into much colder regions.—R. G. Stone.

14176. KOVALEVSKY, G. V. [An experiment in the classification of mountain climates.] *Meteorología i Hydrología* 1939(1): 83-87. 1939.—This appears to be the first attempt at a world-wide classification of mountain climates. The elements on which the classification is based are the ave. annual temp. range taken as an indication of the degree of "continentality" or "oceanicity" of the climate, and the annual precipitation. A more significant element, the precipitation during the growing season, could not be used partly for want of data, and, as in the case of tropical regions, because the growing period covers the whole year. The proposed scheme would have the climate of the world's mountains and highlands divided into 5 main groups. In the first the author puts the regions in temperate latitudes having an extreme continental climate (annual range between 30° and 40°C) and a light annual precipitation. On the other end of the picture, in the last group, are the mts. of tropical regions with an extreme "oceanic" climate (annual range between 1° and 5°C) and with a heavy precipitation. The upper level of vegetation is indicated for each group and sub-group. From the above classification the author finds that there is a definite relationship between the amt. of precipitation and the upper level of vegetation—the greater the precipitation the less

heat and light available for vegetation, and hence the lower the upper limit of vegetation in mountain regions. Thus, he concludes, a basis is offered for "forecasting" the upper level of crop cultivation in mountain areas. The work is based on published material of wide scope though, because of lack of data, a number of important regions unfortunately had to be left out of consideration.—I. I. Schell.

14177. MARNER, J. Die klimatischen Bedingungen für die Siedlung von Nordeuropäern in den Tropen, Dargestellt am Beispiel von Deutsch-Ostafrika. *Arch. deutsch. Seewarte u. Marineobs.* 60(1): 1-70. 12 fig. 1940.—Primarily a study of the comfort-climate of Tanganyika, but a good general introduction discusses the various factors in tropical climate that affect comfort, as follows: strong sunshine, high prevailing temp. and its small annual range, lack of short-period weather changes, the high humidity, the dark cloudy and foggy days of the rainy season espec. in the mountains. The tropical comfort limits of temp. and humidity are taken from a study by Castens, which the author believes agree better with experience in Tanganyika than do the results of other students of the subject. Climograms (temp. plotted against rel. humidity) are drawn for many stations in Tanganyika and the number of months falling above and below Castens' comfort limit are tabulated. From these the following zones are outlined on a map of the colony: (1) all months uncomfortable, (2) 7-11 months uncomfortable, (3) 7-11 months comfortable, (4) all months comfortable. The region above about 1100 m. elevation is in the last 2 categories, and includes over half the country. There is also a valuable description of the sunshine, rainfall, temp., and humidity conditions in each district, with extensive tables of climatic data.—R. G. Stone.

14178. MOHR, G. Weiterer Beitrag zur Frage des Zusammenhangs zwischen Asthmaanfall und Wetter. *Balneol.* 6(2): 75-79. 1939.—183 attacks in 52 asthmatic children at Wyk on Föhr Island were studied. Neither pressure nor its daily variation, nor the level and change in relative humidity had any influence. In some cases the character of the air mass and the wind direction (East) obviously brought on attacks.—R. G. Stone.

14179. ORTH, H. Licht und Schatten im tropischen Afrika. *Umschau.* 43(30): 695-698. 3 fig. 1939.—Measures with a Seybold photocell were made on the German Dozents' Expedition to Africa. The instrument and its filters are descr. Spectral energy distribution curves for stations in Germany, Red Sea, and the uplands of Tanganyika, Kenya, Uganda, Congo, and Angola are compared, covering the bands from 350 to 750 m μ . Total light intensities on clear days in summer in Germany are higher for nearly all wavelengths than the intensities in Africa and the Red Sea. This surprising result indicates marked absorption in central Africa by dust and water vapor and haze in the air. Underneath the rich African forests it is not so dark as commonly believed and actually brighter than in heavy forests of Europe. The structures of the African plants and vegetation claimed to avoid over-insolation probably serve to allow greater light to be received.—R. G. Stone.

14180. PETERSEN, W. F. The relation of clinical symptoms to change in the meteorological environment. *Urol. and Cutaneous Rev.* 1939: 50-56. 1939.—Petersen's theory of weather effects is briefly outlined and case records of the following (taken from the literature) diseases analyzed to illustrate particularly the need for the urologist to consider weather changes (esp. cold waves) in interpreting clinical expressions of symptoms: bilateral cortical necrosis of the kidney, kidney stone, glycosuria, gangrene, thrombophlebitis in pyelonephritis, embolism (post-operative). The onset of many episodes in these cases occurred with passage of cold air (rising barometer), and is explained by a phase of a biochemical pendulation.—R. G. Stone.

14181. PIERY, M., et M. MILHAUD. L'Adaptation au climat (Base de la Climatotherapie). *Paris Méd.* p.1-8. April 16, 1938.—The results of acclimatization process may be congenital (or racial) or acquired. The acclimatization (acclimatization) must be distinguished from the acclimation (acclimated state). Brief summary from the literature of the manner or nature of acclimatization to pathogenic climates (high mts., tropics, polar regions, deserts, and cities) based chiefly on French sources; of inadequate re-

actions to weather in sensitive people (Petersen); of the mechanism of adaptation to therapeutic climates (removal of city people to sea coast and mountains for vacations or climatherapy, in France).—R. G. Stone.

14182. SAPPER, KARL. Über Höhenschichtung und Arbeitskraft tropischen Rassen. *Geogr. Zeit.* 45:1-10. 1939.—The author quotes from many sources and his own observations that in the tropics only the Negro is fully acclimatized to low level climates (hot moist), the Malays and half breeds not so well, and the Indians decidedly not. The upper limit of settlement for Negroes is about 3000 m., of Indians 5000 m., of Malays, Melanesians and Polynesians about 2000-3000 m. By miscegenation and generational acclimatization Negroes are gradually spreading to colder climates, while Indians are deteriorating under influence of whites. The Negro is a harder worker than the Indian. Some black peoples of the Asiatic-Australasian-African region have shown great ability to withstand the cold of high elevations; this ability has probably been enhanced by training.—R. G. Stone.

14183. SCAËTTA, H. Les précipitation dans le Bassin du Kivu et dans les Zones Limitrophes du Fossé Tectonique (Afrique Centr. Equat.). *Mém. Coll. in 40 Roy. Inst. Colon. Belge, Sect. Sci. Nat. et Med.* 2(2): 1-106. Illus. 1933.—An important contribution to African climatology, with many notes on vegetation. The manner in which the opposing trade winds (NE and SE) interact to produce the seasonal rainfall distribution is well brought out. Many local peculiarities in the relation of rainfall to topography are explained by distinguishing the dynamically produced rains from the "thermal" showers. Data are given on the wind velocities and shifts, drops in temp., increases in humidity, rate of rainfall, etc., during heavy showers. Hail is fairly common in the valleys, and above 4100 m. on the mountains graupel and rime. The local xerophilous biotic "relicts" near Kivu are believed to be due to foehn winds, and were there even in past ages when the whole region was generally rainier and supported mesophile forest.—R. G. Stone.

14184. SCHOTT, G. Klimakunde der Südsee-Inseln. *Handbuch der Klimatologie* 4: 1-114. 17 fig. 1938.—A general account of the climatology of the Pacific islands. The climatology of the ocean surface is reserved for the section of the Handbuch on the oceans and is therefore not treated here. But the smaller and particularly the lower islands share the climates of the surrounding sea surface; and the climates of the larger and higher islands depend largely on the circulation of the atmosphere over the vast extent of the ocean. Schott's arrangement of his material is therefore detd. by the zones of atmospheric and oceanic circulation in which the Pacific islands lie. These zones are, in order from north to south: the zone of the northeast trades; the equatorial rainy zone (which lies, however, north of the equator); the equatorial dry zone (approx. symmetrical with the equator); the zone of the southeast trades; and, finally, a border zone that partakes seasonally of the properties of the zones of the southeast trades and of the westerlies of the southern hemisphere. The tabular material Schott has brought together, arranged according to the general plan adopted for the Handbuch, is far more abundant than any earlier collection contains. His discussion is mainly directed toward an interpretation of his material in the light of the general pattern of winds and ocean currents on the one hand, and of the extent and relief of the individual islands on the other. To the special problem that always confronts the investigator of the climates of the Pacific islands, particularly those of the equatorial and southern trade wind zones—the marked yr.-to-yr. fluctuation of precipitation—Schott pays particular attention. He presents data on variability computed for stations having long records, and appends to his regional sections a special discussion of the problem.—From review by John Leighly (courtesy *Bull. Amer. Meteorol. Assoc.*)

14185. SCHULMAN, EDMUND. A bibliography of tree-ring analysis. *Tree-Ring Bull.* 6(4): 27-39. 1940.—An excellent comprehensive list, well-selected and accurate, from many languages and fields, 412 references in all. Restricted largely to tree-rings in relation to climatic and archaeologic studies.—R. G. Stone.

14186. STAMMER, LISA. Kleinklimatische Untersuch-

ungen im Westenseegebiet. *Schriften geogr. Inst. Univ. Kiel* 8(1): 1-61. Illus. [1937].—A small area surrounding a lake in the sandy glaciated north German forested lowland near Kiel is studied in great detail by microclimatic methods of the Geiger school over the period Jan.-Nov. 1937. Air temps., winds and humidities were measured in various spots and related to the weather situation, the phenology, frost, lake fogs, soil conditions, topography, etc. Differences of 3-4°C between places of 20 m. difference in elevation were shown to have an important effect on the phenological dates (8 days local variation in blooming date). The lake influence was noticeable $\frac{1}{2}$ km. inland from the shore. The relations of wet soil, lake influence, wind protection, warm and dry soil, etc., to climate and vegetation are illustrated by numerous direct observations.—R. G. Stone.

14187. WINSLOW, C.-E. A., L. P. HERRINGTON, and JEAN HUME NELBACH. (John B. Pierce Lab. Hyg., New Haven, Conn.). The influence of atmospheric temperature and humidity upon the dryness of the oral mucosa. *Amer. Jour. Hyg.* 35(1): 27-39. 1942.—A method is described which appears to yield significant measurements of the degree of moisture present on the surface of the oral mucosa, thus making possible measurement of the drying effect of various atmospheric conditions upon the oral surfaces. This drying effect is found to be a function, not of the temp. or rel. humidity of the atmosphere, but of its vapor pressure. With vapor pressure below 0.4 inch of mercury there is a marked drying of the oral mucosa, the moisture present on its surface being about $\frac{1}{2}$ that observed at higher vapor pressure. Above this point (0.4 in.), the oral surfaces are relatively moist, but show variations which appear to be related to physiol. reactions of vasoconstriction. Marked drying of the mucosa occurs at air temp. below 50° F with any moisture content; at 60° with < 77% rel. humidity; at 70° with < 54% rel. humidity; at a temp. of 80° with < 39% rel. humidity.—C.-E. A. Winslow.

14188. ANONYMOUS. Influence of atmospheric humidity upon the dryness of the membranes of the nose and throat. *Heating, Piping and Air Conditioning*, 1941. 776-777. 1941.—Quite independent of the influences of atmospheric humidity upon thermal interchanges between environment and the body, is the direct influence of a dry atmosphere upon the mucous membranes of the nose and throat. Huntington (1919, 1924) has shown that dry climates and seasons are associated with increases in mortality rates; but the nature of the influence exerted has been little understood. Many physiologists have shown that, in general, the expired air approaches body temp. and 100% rel. humidity. Therefore, it is clear that the moisture taken from the membranes of nose and throat in respiration must vary with the temp. and humidity of the inspired air. The most exhaustive study of this subject was presented to the Amer. Society of Heating and Vent. Engrs. by Seeley (ASHVE Trans., 1940). Seeley found that (except in very cold atmospheres) the expired air had a temp. of 90-95° F and was > 90% saturated with moisture, containing 30-37 g. of water per cu. m. of respired air. Since this value is approx. constant, it is clear that the drying effect on the mucous membrane must be related to the absolute—not the relative humidity—of the atmosphere. Recent studies at the John B. Pierce Laboratory of Hygiene (Winslow, Herrington, and Nelbach, *Am. Jour. Hyg.*, 1941) have directly confirmed this conclusion. In these expts., direct observations were made of the moisture actually present on the surface of the back of the throat (as measured by the amt. of moisture absorbed by blotting paper from a given surface under standard conditions). The relation of the phenomenon to abs. humidity was confirmed; and an interesting critical point in the process was detd. At atmospheric water-vapor pressure below 0.4 in. of Hg at any temp. (50°-80° F) the throat surface was dry. Between 0.4 and 0.5 in. a marked increase in moisture was manifest, equal to a sudden doubling of the water absorbed by the blotting paper. At a still higher vapor pressure a secondary decrease in moisture on the mucous surface was observed at certain points (70° F with 70% rel. humidity, and 80° F with 50% rel. humidity) which is believed to be associated with vasomotor reactions related to the onset of sweat secretion. The point of primary interest is the critical point at 0.4 in. vapor pressure. This finding means that marked drying of

the membranes of the nose and throat must occur at air temp. below 53°F with any moisture content up to saturation; at a dry-bulb temp. of 60°F with < 77% rel. humidity; at a dry-bulb temp. of 70° F with < 54% rel. humidity; and at a dry-bulb temp. of 80°F with < 39% rel. humidity. "There is no direct evidence that the drying of the mucous surfaces is actually undesirable. The general opinion that very dry air irritates the throat and the clinical practice of treating the membranes of persons suffering from bronchial disease by soothing inhalations would seem to suggest that the problem may be of importance. If dry air is harmful, it seems obvious that its influence must be present, not merely in hot, dry air, as has often been thought, but quite as much in cold, dry air. If it is desired to control the influence of dry air on the mucous membranes, a high vapor pressure must be maintained corresponding at 70°F to > 50% of saturation."—From *Second Rept. of ASHVE Techn. Adv. Comm. on Physiol. Reactions*.

ANIMAL

14189. LOW, JESSOP BUDGE. (Iowa State Coll.) The ecology and management of the redhead, *Nyroca americana* (Eyton), in Iowa. *Iowa State Coll. Jour. Sci.* 16(1): 90-92. 1941.—Redhead (*Nyroca americana*) nested in the glaciated marshes of Clay and Palo Alto Counties during the 3 yrs. of observation, 1938-1940. The ducks arrived in Iowa on spring migration March 20. Sex ratio was 1.42 ♂♂ to 1 ♀. Nesting commenced April 30 and terminated Aug. 12. A total of 160 nests under observation, representing 60% of the total, gave a nesting density on the 925 acres of available vegetation of 1 nest to 10.6 acres. 90 nests (56.25%) terminated successfully; 22 nests (13.75%) were destroyed, and 48 nests (30%) were deserted. Flood water was the most destructive agent of nests; recession of water level was the most important factor in nest desertion. Promiscuous egg-laying was inversely proportional to the nesting success and directly proportional to the fluctuations in the water level. An average of 9.75 eggs was recorded for 115 complete clutches. The most extensive nesting cover species were lake sedge (*Carex lacustris*), narrow-leaved cattail (*Typha angustifolia*), hardstem bulrush (*Scirpus acutus*) and awned sedge (*C. atherodes*). Nesting densities were 1 nest to 3 acres for slender bulrush (*S. heterochaetus*), 1 nest to 6 acres of hardstem bulrush, 1 nest to 11 acres of whitetop (*Fluminea festucacea*), 1 nest to 13 acres of lake sedge and 1 nest to 16 acres of narrow-leaved cattail. Vegetation in water averaging 6 inches deep was preferred for nesting. Nesting densities reached a maximum where not less than 10% and not more than 25% of the habitat was open water. Small areas of open water, such as occurred around muskrat (*Ondatra zibethica*) lodges, uniformly distributed over the nesting habitat were found desirable to nesting Redhead populations. Improvement of the nesting habitat of the Redhead in Iowa must aim at the fulfillment of the nesting needs of the birds, namely, sufficiently controlled water levels and emergent vegetation.—J. B. Low.

PLANT

14190. BHARUCHA, F. R., and R. N. DAVE. (Bombay, India.) Succession of xerophytic grasslands of Raita. *Proc. Indian Sci. Congr.* 28: paper no. 39. 1941.—The succession of vegetation on the grasslands of Raita (near Bombay) is described. The improvement, the scientific management using synthetic fertilizers and a method of evolving a system of rotational grazing in three years, are also dealt with.—K. T. Jacob.

14191. BHARUCHA, F. R., and D. B. FERREIRA. (Bombay, India.) The biological spectra of Matheran and Mahabaleshwar. *Proc. Indian Sci. Congr.* 28: paper no. 40. 1941.—The floras of Matheran and Mahabaleshwar (Bombay Presidency), which are similar in their tropical, moist, evergreen vegetation, were analysed on the basis of Raunkiaer's system of life-forms. Both have a Phanerophytic climate, consistent with the heavy rainfall and fairly high and constant temperature.—K. T. Jacob.

14192. BHARUCHA, F. R., and D. B. FERREIRA. (Bombay, India.) The biological spectrum of Madras. *Proc. Indian Sci. Congr.* 28: paper no. 41. 1941.—From the biological spectrum of Madras, its climate might be said to be

Nano-phanerophytic, with a high percentage of Chamaephytes. Its spectrum resembles that of Aden whose climate is between tropical and sub-tropical.—*K. T. Jacob.*

14193. BHARUCHA, F. R., and R. N. DAVE. (*Bombay, India.*) The biological spectrum of a grassland association. *Proc. Indian Sci. Congr.* 28: paper no. 42. 1941.—An analysis of the floristic composition of the grassland, on the hilly and stony grounds in Bombay and Salsette Islands, showed an association predominantly therophytic or composed of annual plants. The annual rain-fall is over 100 inches and hence the spectrum can be explained only if some biotic factor is also taken into consideration.—*K. T. Jacob.*

14194. DUGAND, A. (*Inst. Nat. Sci., Bogota.*) On the vegetation and plant resources of Colombia. *Chron. Bot.* 7(2): 71-75. 1942.—The climate is sketched and the vegetation is outlined (1) rain-forest; (2) eastern llanos, grassy savannas with groves of palms; (3) Caribbean coastal plain, with woody scrub; and (4) mountainous districts with subtropical and temperate forests. The last includes the Coffee Belt of forests. There is a bibliography.

14195. EPLING, CARL, and HARLAN LEWIS. (*U. California, Los Angeles.*) The centers of distribution of the Chaparral and coastal Sage associations. *Amer. Midland Nat.* 27(2): 445-462. 8 maps, 1942.—The chaparral and coastal sage associations of California have their present centers of distribution in the Diegan area, that is, in San Diego County, and in adjacent Baja California. Both communities seem to have had a similar historical development and both are derivatives of the Miocene vegetation which entered the s.-w. U. S. from the North Mexican Plateau.—*Auth. concl.*

14196. GATES, BURTON N. (*Massachusetts Dept. of Agric., State House, Boston.*) The dissemination by ants of the seeds of bloodroot, *Sanguinaria canadensis*. *Rhodora* 44(517): 13-15. 1942.

14197. GLOCK, WALDO S. The response of trees to climate. *Proc. Sixth Pacific Sci. Congr.* 3: 617-619. 1939(1940).—The term "tree ring" is abandoned. A growth layer is defined as "the physiological, structural, and ecologic unit in a tree; it is the unit of growth and consists of light wood and dense wood." "An annual increment, a time or seasonal unit, is composed of one or more growth layers." As a substitute for the doubtful method of direct correlation between "ring" thicknesses and amount of rain caught in a gauge, the pattern of the growth layers is compared with the type of rainfall in order to formulate a basis for an historical method applicable to fossil woods. Three types of rainfall with 3 distinctive patterns are recognized thus far: (1) the California type, a single rainy season in the winter, marked by a uniform pattern in which each growth layer is very probably an annual increment; (2) the West Texas type, a single rainy season in the summer, with an irregular pattern marked commonly by a multiplicity of growth layers in an annual increment; and (3) the Arizona type, a double rainy season, marked by an alternation of California and West Texas patterns. Furthermore, the patterns show features dependent upon the soil-moisture zone—optimal, maximal, minimal—in which the trees live. These features are average thickness of growth layers, uniformity, percentage variations, incidence of auxiliary layers, cycle lengths, and cross-dating.—*W. S. Glock.*

14198. HANSEN, HENRY P. (*Oregon State Coll.*) The influence of volcanic eruptions upon post-Pleistocene forest succession in eastern Oregon. *Amer. Jour. Bot.* 29(3): 214-219. 1942.—A pollen study of a montane peat deposit, on the east slope of the Cascade Range in central Oregon, indicates that the post-Pleistocene forest succession was influenced more by the deposition of a pumice mantle than by climate. At least 2 volcanic eruptions are evidenced by the presence of pumice strata in the peat profile. An initial predominance of *Larix occidentalis* suggests repeated fire prior to the beginning of sedimentation. When the effects of the hypothetical fires had been modified, *Pinus contorta* assumed predominance for a short time, only to be superseded by *P. ponderosa* as the climate became warmer and drier. The latter trend was interrupted by a pumice fall that favored a resumption of *P. contorta* predominance. The latter maintained its predominance to the present, although another pumice fall interrupted a 2d trend toward

a *P. ponderosa* climax. The source of the pumice is not known with certainty, but it seems probable that at least one, probably the upper stratum, came from the eruption of Mt. Mazama between 5000 and 10,000 yrs. ago. This eruption resulted in the formation of the caldera holding Crater Lake.—*H. P. Hansen.*

14199. HANSEN, HENRY P. (*Oregon State Coll.*) Post-Mount Mazama forest succession on the east slope of the central Cascades of Oregon. *Amer. Midland Nat.* 27(2): 523-534. 1942.—Pollen profiles of 4 peat deposits reveal that forest succession on the east slope of the central Cascades of Oregon has been largely controlled by a thick pumice-mantle that extends e. and n. of Crater Lake. The source of the pumice was the eruption of Mt. Mazama about 5000 yrs. ago, forming the caldera holding Crater Lake. The trends of indicated forest succession reflect each bog's location with respect to climate and the depth of the pumice in adjacent areas. In all profiles, *Pinus contorta* was predominant when deposition of the pollen-bearing sediments began. In 2 profiles it has been predominant throughout all of post-Mount Mazama time; in a 3d it was superseded by *P. albicaulis* during the latter half; in the 4th profile located in a damper climate, *P. contorta* generally declines from bottom to top, while *Pseudotsuga taxifolia*, *Tsuga heterophylla*, and *Pinus engelmanni* gain in abundance upward in the profile. The pollen profiles of the 2 of the bogs suggest a slight increase in moisture, with possibly some cooling to a maximum during post-Mount Mazama time.—*H. P. Hansen.*

14200. HOLTTUM, R. E. The uniform climate of Malaya as a barrier to plant migration. *Proc. Sixth Pacific Sci. Congr.* 4: 669-671. 1939(1940).—It is concluded that the climatic conditions of Malaya are such as to form a barrier to the natural dispersal of many plants which are adapted to a seasonal climate, and need the stimulus of a dry season to make them flower, or need a regular resting period. This climatic barrier is the more formidable owing to the presence of the immensely rich Malayan flora, adapted to the peculiar local conditions.—*Auth. concl.*

14201. IRVING, M. A study of the effects of eucalypts on the soil, their nutrient requirements, and transpiration. *S. African Jour. Sci.* 37: 133-135. 1941.

14202. LATTER, OSWALD H. (*The Elms, Charterhouse Road, Godalming.*) A factor in the dispersal of burdock (*Arctium Lappa*, Linn.). *Nature [London]* 148(3763): 726. 1941.—The yellow dust that readily falls from the ripe burr is composed of very fine, stiff bristles 1-2 mm long, sharp pointed, armed with many sharp spines and capable of causing a rash on human skin. Irritation by these bristles causes animals to break open the burr in attempting to loosen it from its pelage.—*E. D. Crabb.*

14203. MERRILL, E. D. Man's influence on the vegetation of Polynesia, with special reference to introduced species. *Proc. Sixth Pacific Sci. Congr.* 4: 629-639. 1939(1940).—A general discussion of the subject, with a brief review of various attempts to explain the origins and relationships of the Polynesian flora. Man-introduced species, particularly the weeds, are roughly classified into 2 categories—those, once introduced, of relatively slow dissemination, and those of rapid dissemination. The evidence shows that most of the weeds now dominant in Polynesia reached this area from other parts of the Old and New Worlds after the expansion of the European colonizing nations, beginning in the Pacific after 1520.—*E. D. Merrill.*

14204. OVERBECK, F., and S. SCHNEIDER. Torfzer-
setzung und Grenzhorizont, ein Beitrag zur Hochmooren-
wicklung in Niedersachsen. *Angew. Bot.* 22(5): 321-379. 1940.—A new method for studying peat development is described. The peat is powdered and then rubbed onto a sheet of white paper with the finger. The intensity and shade of color is correlated with the degree of humus decomposition. A color key is presented. The method is not as accurate as alkali-color tests or the acetyl bromide test but is especially suited for rapid demonstration purposes. The color test papers can be preserved for future reference and comparisons. The color is not affected by amount of rubbing or pressure. A study of the floral composition and age of ten moors in north-western Germany was made. Pollen analyses of numerous bog plants are presented in

graphic form. In all strata *Alnus* is most abundant, followed by *Corylus* and *Quercus*. The climatic and floristic history of the moors based upon floral remains and degree of organic decomposition is discussed.—*H. C. Beeskow*.

14205. PARIJA, P., and B. PARIJA. (Cuttack, India.) Study of the weeds of the Chilka Lake.—1. Proc. Indian Sci. Congr. 28: paper no. 43. 1941.—Towards October *Potamogeton pectinatus* floating in masses in the lake becomes etiolated and weak as little light penetrates through the turbid water. The increasing salinity of the lake controls the growth of the weeds and young bivalves eating into the cortical tissues of the weeds cause the breaking of the leaves by the waves.—*K. T. Jacob*.

14206. SCAËTTA, H. L'évolution des sols et de la végétation dans la zone des latérites en Afrique occidentale. Compt. Rend. Acad. Sci. [Paris] 212(4): 169-171. 1941.

14207. SMITH, RICHARD MERIWETHER. Some effects of black locusts and black walnuts upon the growth of grass and condition of the soil in southeastern Ohio. Ohio State Univ. Abst. of Doctor's Dissert. 35: 133-140. 1941.—Black locust and black walnut trees were selected in pastures so that the grass and soil under the trees could be compared to that of the adjacent open untreated pasture without the complication of other variables. More desirable grass species were consistently found under both tree types; and in most cases the total yields were higher, except in dense black locust groves. The protein content of grasses under black locusts was much higher, evidently due to nitrogen supplied by the root nodules. There was little difference in Ca or P under the trees, or in N under walnuts compared to open pasture grasses. The observed facts are explained on the basis of the altered conditions under the trees, involving reduced light, altered moisture relations, soil enrichment by the tree leaves, altered C/N balance, biotic populations, and physical conditions of the soil. The relative importance and net effect of these factors are believed to vary depending upon other circumstances; but in poor pastures the tendency is toward pasture improvement either from black locusts or black walnuts in this particular region, provided they are spaced to prevent overlapping of branches. These tree species seem more favorable for pasture than other common spp.; black walnuts seem more favorable than black locusts except for their inability to fix N. Rapid leaf breakdown is a factor favoring both compared to most other trees. Shade and tree root competition are likely to limit yields under black locusts in good pastures, particularly where the trees are closely spaced. These limits to yield are less likely with walnuts.—*R. M. Smith*.

14208. THOMAS, A. S. (Dept. Agric., Kampala, Uganda.) Ecological factors and indicator plants in Tropical Africa. Chron. Bot. 7(2): 71. 1942.—"Little is known about indicator plants in the tropics . . ." but the grazing plants are the most useful group of plant indicators.—*L. J. Gier*.

14209. WILLIAMS, LLEWELYN. (Field Mus. Nat. Hist.) Natural resources of Venezuela. Chron. Bot. 7(2): 75-77. 1942.—Discussion of principal crops and of forestry possibilities. Gov't expt. stations conduct research on some crops and also provide for an agricultural training for selected students.—*L. J. Gier*.

OCEANOGRAPHY

(See also Entry 15577)

14210. DOMANTAY, JOSE S. Report on the marine fauna of Ulugan and St. Paul's Bays, Palawan. Proc. Sixth Pacific Sci. Congr. 3: 93-96. 1939.—The shores of Ulugan bay consist of mud, sand and rock; it has about 15 rivers and a number of smaller streams flowing into it. Brown algae are dominant in the shallow water and prevent the growth of corals, except for a few hardy ones. In general the fauna is poor; 5 spp. of sponges, a fair number of crustaceans, several forms of gastropods, but echinoderms are poorly represented. The fauna of St. Paul's bay is somewhat richer; 6 spp. of sponges, coelenterate and crustacean forms are about the same as in Ulugan, mollusca more varied in St. Paul's and so are tunicates, echinoderms more varied in Ulugan.—*Chancey Judy*.

14211. DUNBAR, M. J. (Nat. Res. Coun.) Marine macroplankton from the Canadian eastern Arctic. II. Medu-

sae, siphonophora, ctenophora, pteropoda, and chaetognatha. Canadian Jour. Res. Sect. D. Zool. Sci. 20(3): 71-77. 1 fig. 1942.—13 spp. of medusae, 1 siphonophoran, 2 ctenophores, 2 pteropod molluscs, and 2 chaetognaths are recorded from coastal waters of the Canadian eastern Arctic, many of them for the first time. All except one are known to be arctic or arctic-boreal species. *Hybocodon prolifer* has not hitherto been recorded from Arctic water. Specimens answering to this species were found by the author in large numbers at Lake Harbour, on Hudson Strait. The determination of the medusa is possibly not satisfactory, and cannot be considered certain until the hydroid is found. No species of *Hybocodon* has been recorded from Greenland water, however, and hence this discovery may be useful to distinguish Canadian polar water from water of the Greenland current.—*Auth. abst.*

14212. GRAHAM, HERBERT W. (Mills Coll., Oakland, Calif.) Plankton production in relation to character of water in the open Pacific. Jour. Marine Res. 4(3): 189-197. 2 fig. 1941.—In the open Pacific Ocean from Sept. to November, 1929 there was a greater production of total plankton in the tropics between latitudes 20° north and 11° south than between latitudes 20° and 34° N. There was a positive correlation between the density of plankton in the upper 150 m. and the phosphate content of the water in the upper 100 m. The water richer in phosphate and plankton occurred in regions where there were indications that some form of vertical circulation was transporting phosphate from the reservoirs below to the upper layers. These regions were in (a) the California Current and its outflow, (b) the North Equatorial Current and northern edge of the Counter Equatorial Current, and (c) the northern part of the S. Equatorial Current. Plankton production is not a function of latitude but depends upon the presence of "new water" high in nutrient salts. Although characteristic of high latitudes, "new water" may form in regions of relatively high temperature as well and result in increased plankton production.—*H. W. Graham*.

14213. KOKUBO, SEIJI. Quantitative studies of the neritic littoral microplankton of Japan collected at sixteen stations ranging from Saghalien to Formosa, 1931-1933. Proc. Sixth Pacific Sci. Congr. 3: 541-564. 2 maps. 1939 (1940).—A quantitative study was made of the microplankton collected in 1931-1933 at 16 stations along the Japanese coast. Like the oceanic plankton, the littoral plankton tends to be more abundant in the north than in the south. This suggests that the productivity of the sea is in general greater in the north than in the south. However, plankton production and fishery production do not always coincide, because of the difference of the ecology of animals. The kinds of the plankton collected by the present method were: Diatoms, Dinoflagellata, Tintinninea, Silicoflagellata, Copepoda, Cladocera, Copelata, Hydromedusae, Radiolaria, Cyanophyceae, and larval plankton. Quantitatively, the first 3 groups are most important, the others following in the order given. The number of plankton (number of cells per liter of water) ranged from a minimum of 19 (Hamada, Sept. 27, 1931) to a max. of 5,312,275 (Takasima, June 1, 1931). Station by station plankton abundance tended to decrease from north to south, but with discrepancies due apparently to local neritic conditions. As the present investigation is limited to consideration of microplankton, it is naturally dominated by the diatoms, and consequently the seasonal change is chiefly manifested by the diatoms. Observations of 16 stations during 3 yrs. indicated that diatoms vegetate either in spring or in autumn, or in both these seasons and that secondary vegetation is often observable. The seasonal change of diatoms is variable and irregular; the vegetation is prone to change in accordance with temporal neritic factors, e.g., nutrient. The stations investigated can be divided into 2 groups, those with more, and those with fewer, than 10,000 plankters per liter; the former group of stations represents the productive seas, and the latter the barren seas. Change in diatom vegetation is apparently governed by elementary factors such as water temp., but possibly by other factors also, e.g., nutrient conditions or submarine illumination. This probably produces the temporal change in vegetation, thus

making the seasonal or local change irregular.—*From auth. sum.*

14214. LIEBMAN, EMIL. River discharges and their effect on the cycles and productivity of the sea. *Proc. Sixth Pacific Sci. Congr.* 3: 517-523. 2 maps 1939(1940).—The discharge of the Nile river has a great effect on the productivity and the life cycle of a great portion of the southeastern Mediterranean Sea. Effects are noticeable at 500 km. from the center of the Nile Delta. There was a large increase in the quantity of plankton when the discharge of the river was greatest; correlated with this was a marked increase in the catch of fish some 25 to 30 km. off the 2 mouths of the Nile.—*Chancey Judy.*

14215. SARGENT, MARSTON C. A theoretical definition of production. *Proc. Sixth Pacific Sci. Congr.* 3: 513-516. 1939(1940).—The production of organic matter in a portion of the sea during a period can be defined as the number of calories of solar radiant energy converted into chemical potential energy. This can be measured directly for any 24-hr. period by the amt. of O_2 evolved in a representative sample of sea water enclosed in a bottle and exposed in situ. If it is desired to make an extensive series of observations over a large area, this method becomes cumbersome. If the ratio of production to population at intervals (of space and time) is established, the total production can then be estimated with the help of population measurements made at much closer intervals.—*M. C. Sargent.*

14216. SCHALLEK, WILLIAM. (Harvard U.) The vertical migration of the copepod *Acartia tonsa* under controlled illumination. *Biol. Bull.* 82(1): 112-126. 1942.—The natural diurnal vertical migration of this copepod can be reproduced in the laboratory. Animals kept in tall glass cylinders exposed to window light move up at night and down during the day. Incandescent or fluorescent lights can be substituted for daylight without affecting this behavior. Migration does not depend upon the area of the source, spectral energy distribution, or total intensity of the light. When illuminated obliquely to the axis of the cylinder, *A. tonsa* sinks downward. This behavior, which is followed by an upward movement in darkness, is believed to account for the normal migration of this form. When the illumination is parallel to the axis of either a horizontal or a vertical tube, *A. tonsa* swims toward the light. Such highly directional illumination is not likely to be encountered in nature, and this behavior is believed to be a laboratory artifact.—*William Schallek.*

14217. SHEARD, K. (S. Australian Mus.) Improved methods of collecting marine organisms. *Rec. S. Austral. Mus.* 7(1): 11-14. 1 fig. 1941.—This describes a new type of high-speed plankton net, tested to 6 knots, a simple method of using a submarine light of low intensity, and a formalin method of securing marine animals from sand films and from the crevices of rocks and material secured by dredging.—*K. Sheard.*

14218. TOWNSEND, L. D., ARNE ERIKSEN, and HARRIET CHEYNE. Pollution of Everett Harbor. *State Pollution Comm. State Washington Pollution Ser. Bull.* 3. 1-56. 25 fig. 1941.—The extent, source and effects on fish and plankton of pollution in Everett Harbor, Wash. were studied over a 15-month period. Sources of pollution were evaluated on the basis of biochemical oxygen demand. It was found that 97% of the oxygen demand resulted from waste from sulfite pulp mills, causing severe depletion of O_2 in the surface waters of the harbor, and attendant destruction of fish and certain sedentary organisms in restricted parts of the harbor. A specific test for waste sulfite liquor in sea water was devised. A 50-ml. sample of sea water was treated with 1 ml. of freshly prep'd. diazotized sulfanilic acid and borax (1 ml. 0.025 N sulfanilic acid in 5 N acetic acid, 1 ml. 0.025 N Na nitrite, and 50 ml. 0.05 N Na tetraborate) in a 50 ml. comparison tube. The color obtained was compared with simultaneously prep'd. standards in pure sea water to which known amt.s. of waste had been added. Fish kills were frequent along the waterfront of Everett Harbor and the growth of piling organisms was markedly inhibited. There was no evidence that migratory salmon were being seriously affected, although considerable areas around the mouth of an important salmon river were at times uninhabitable for salmon. Density differences between

wastes at points of discharge and the receiving salt water allowed stratification which confined the pollutant to the surface 30 feet of the harbor. The pollutant was carried into the mouth of the Snohomish River at times by strong tidal currents, but no salmon were observed to be distressed there. Phytoplankton, determined by plant pigment and crude chlorophyl extracts, was less abundant in polluted water, but was present in sufficient amt. to be an important factor in the process of reaeration of the harbor. This reaeration was accomplished by: dissolved O_2 from Snohomish River, 7%; atmospheric reaeration, 10%; from mixing Puget Sound water, 60%; and from phytoplankton photosynthesis, 23%. Fish kills reported from localities farther than 12 miles from the pulp mills were shown to have resulted from causes other than the pollution from Everett.—*L. D. Townsend.*

14219. YONGE, C. M. Observations on the biology of coral reefs. *Proc. Sixth Pacific Sci. Congr.* 3: 605-613. 1939 (1940).—Biologically, coral reefs are marine communities found only in tropical waters. Their wide distribution shows an outstanding success in the adaptability of the Madreporaria to a great variety of environmental conditions. They are carnivorous in their feeding habits and are unable to digest plant material even when it is introduced into the coelenteron. They feed almost exclusively at night and digestion is very rapid. The significance of the zoöxanthellae which are always associated with them is uncertain; these algae obtain food and shelter, but it is doubtful whether they make any substantial contribution to the corals, except by using the waste products of the corals and furnishing them some O_2 during their photosynthetic activities.—*Chancey Judy.*

LIMNOLOGY

(See also Entry 15044)

14220. BRINLEY, FLOYD J., and LEONARD I. KATZIN. (U. S. Publ. Health Serv., Cincinnati, Ohio.) Distribution of stream plankton in the Ohio River system. *Amer. Midland Nat.* 27(1): 177-190. 1942.—This paper is based upon 1,400 plankton samples collected from most of the major watersheds of the Ohio Basin during 1939 and 1940. In general, the species found are widely distributed over the entire basin. The number of individuals and species increases with the onset of warm weather, reaching a peak in Aug. and Sept. An exception to this is the Ohio R., where the reverse change occurs, largely due to diatoms in the spring. The streams that receive the largest amt. of organic pollution contain the largest number of spp. and individuals, which is probably associated with the amt. of available food in the stream.—*F. J. Brinley.*

14221. EDERSTROM, H. E. (Northwestern U.) The effects of carbon dioxide on *Daphnia*. *Trans. Illinois State Acad. Sci.* 34(2): 218-220. 1941.—The phototropic response of *D. pulex* to white light was tested by placing animals in a 46 cm. long trough illuminated through one end by a 100-watt lamp. Of 2244 *Daphnia* tested in filtered L. Michigan water 2055 were found in the brighter half of the trough after 1-min. exposure to the light. Longer trial periods gave much the same results. Free CO_2 was added to the lake water in 11 concs., varying from pH 5.7 with 450 ppm. to pH 7.8 with 10 ppm. In each soln. *Daphnia* were appreciably more photopositive than in lake water, the increase being in general proportional to the amount of free CO_2 present. *Daphnia* observed for 8 hrs. in a 46 cm. long vertical tube illuminated from above were found at considerably higher levels when CO_2 was added than in normal lake water. When the same tube was uniformly illuminated from the side the *Daphnia* remained near the bottom in CO_2 solutions. In normal water the same animals responded to side illumination much as they did to overhead illumination. The CO_2 effects observed may be of significance in the diurnal vertical migrations of these crustaceans.—*H. E. Ederstrom.*

14222. GRIFFITHS, FRANCIS P., and ELDEN D. YEOMAN. A comparative study of Oregon coastal lakes from a fish-management standpoint. *Proc. Sixth Pacific Sci. Congr.* 3: 323-333. 1939(1940).—Lakes in the coastal zone have temps. suitable for rapid and continuous fish growth. The highest water temp. observed was 69° F and the lowest was

44.6°. Because of moderate climate there is no regular turnover and chemical stratification as well as O₂ deficiency was observed in the deeper lakes. Management practices for trout and other game fish are discussed.—F. P. Griffiths.

14223. HANKE, HORST-HERBERT. (Halle a. d. Saale.) Hydrographische und biochemische Untersuchungen über die Plankton-Produktionskraft des Süssen Sees bei Halle. *Bot. Arch. [Leipzig]* 42(2): 149-200. 18 fig. 1941.—The Süssen lake which is rich in minerals may be classed as eutrophic. There is a certain relationship between the temp. and development of the phytoplankton. The chemical factors showed a very constant annual rhythm. The chlorophyll content of the total alcoholic extracts of the plankton from 1 l. of water was detd. by means of a Pulfrich photometer at various periods, as a measure of the production strength of the lake. The maximum production of chlorophyll (460 γ per liter) occurs in late summer, at which time the blue-green alga *Microcystis aeruginosa* prevails. During late fall and winter, the chlorophyll decreases to about $\frac{1}{3}$ of its maximum as a result of the increasing growth of the diatom *Cyclotella meneghiniana* which destroys the blue-green algae. 3 periods of phytoplankton were identified: mixed plankton (largely Chlorophyceae with some Cyanophyceae and Cyclotella); Cyanophyceae (almost exclusively *Microcystis aeruginosa*); and diatom plankton. During the 2d period, only chlorophyll a was detected to any extent while during the first period both chlorophyll a and b were found. By means of chromatographic adsorption analyses, the single components of the total pigment were detd. for the different time phases and compared with the results of the planktological tests. A comparison between the marine brown alga, *Laminaria saccharina*, the Süssen diatom, *Cyclotella* and the marine benthos-diatom from the brine springs indicated widespread uniformity for the physical radiation and chemistry of the pigment arrangement in their brown plastids.—C. K. Horner.

14224. HIRST, JOHN MENDEL. (Scottdale High Sch., Scottdale, Pa.) A limnological study of the streams in east Tionesta Tract, Allegheny National Forest, McKean and Warren Counties, Pennsylvania. *Bull. Pittsburgh Univ.* 38 (2): 224-229. 1942.—The streams of the East Tionesta Tract are typically mountain streams which have worn V-shaped valleys in the elevated dome of what is generally known as the Harrisburg peneplain, and although not itself glaciated, it was probably affected by glaciers which existed on approx. 3 sides. From established observation stations, these rheocrene streams were found to be surrounded by essentially a Hemlock-Beech association. The rapidly moving waters of the streams were studied for velocity and volume by using T-shaped floats over timed distances and by data obtained from charted cross sections of the stream beds. The pH was measured by La Motte Universal outfit and O₂ content detd. by the Winkler method. The biol. observations of the flora and fauna collected from the stream and adjacent territory in relation to the physical, chemical and geological observations showed a practically stabilized environmental condition. The number of forms of organisms was limited by the environment. The comparison of the 2d growth areas with the virgin timber areas proved the latter to be most limiting on its inhabitants.—J. M. Hirst.

14225. LACKEY, JAMES B. (Stream Pollution Invest. Sta., Cincinnati, Ohio.) The plankton algae and protozoa of two Tennessee rivers. *Amer. Midland Nat.* 27(1): 191-202. 1942.—Plankton Algae and Protozoa in 134 samples of Cumberland and Duck River waters showed 203 spp. representing 149 genera. Notes on some rare, and some new N. American records are included, with figures of 2 possible new flagellates.—J. B. Lackey.

14226. LINDEMAN, RAYMOND L. (U. Minnesota.) Seasonal distribution of midge larvae in a senescent lake. *Amer. Midland Nat.* 27(2): 428-444. 1942.—A 4-yr. population study of midge larvae in a senescent eutrophic Minnesota lake revealed striking annual and seasonal oscillations. *Chironomus plumosus*, *C. decorus* and *C. lobiferus* develop 3 generations per yr.; *Procladius culiciformis* and an undetd. sp. of *Palpomyia* develop 2, and probably sometimes 3; *Chaoborus punctipennis* develops several over-lapping generations per yr. Comparisons with larval populations in other lakes indicate that the midge larvae living in the

cold profundal ooze of deep eutrophic lakes usually have but 1 generation per yr., while in the warm ooze of the shallow senescent lake here studied, these spp. have additional generations produced during the summer. These conclusions are in accord with the temp.-sum rule of insect development.—R. L. Lindeman.

14227. MALONEY, M. THEODOSIA (Mount St. Joseph Teachers Coll., Buffalo), and WILLIS L. TRESSLER (U. Maryland). The diurnal migration of certain species of zooplankton in Caroga Lake, New York. *Trans. Amer. Microsc. Soc.* 61(1): 40-52. 1942.—A study was made of the species of Copepoda and their diurnal migrations in Caroga Lake, New York. *Diaptomus minutus* was concentrated below the thermocline with slight vertical migrations above and below the thermocline. Immature forms showed a more definite reaction to light intensity. *Cyclops bicuspidatus* congregated in large numbers above the thermocline with a definite movement to and from the surface. The movement of the immature forms was approximately the same as that of the adults. *Epischura nevadensis* showed a complex migration pattern from the surface to a depth of fifteen meters. Nauplii were concentrated in large numbers above the thermocline with no definite migration. It was concluded that in Caroga Lake, a complex interaction of several factors could only explain the migration of the species studied and that the thermocline offered little hindrance to vertical migrations.—Authors.

WILDLIFE MANAGEMENT—AQUATIC

(See also Entries 14218, 14276, 15554)

14228. CLARK, FRANCES N. The sardine: international aspects of its life history and exploitation. *Proc. Sixth Pacific Sci. Congr.* 3: 251-256. Map. 1939(1940).—The sardine is found from Alaska to the Gulf of California but the young are more abundant in southern waters. This is apparently explained by more intensive spawning in the southern regions. These young fish remain on the nursery grounds for perhaps 6 months or more before exhibiting a northward movement during each summer. This northward summer migration is extended farther each year and the largest and oldest fish reach British Columbia. During the winter a reverse southward movement precedes the spring spawning. Throughout its entire range the sardine is exploited by man but in the past 20 yrs. more than 70% of each year's catch came from California waters. The max. catch occurred in 1936 when almost 800,000 tons were taken by the entire Pacific industry. Detailed studies indicate that the present exploitation seriously endangers the supply and regulatory measures should be adopted.—F. N. Clark.

14229. ELLIS, M. M., B. A. WESTFALL, and M. D. ELLIS. (U. Missouri.) Arsenic in fresh-water fish. *Indust. and Engineer. Chem. Indust. Ed.* 33(10): 1331-1332. 1941.—The arsenic content of 681 fresh-water fishes representing 15 spp. taken from inland waters in Florida, Georgia, Alabama and Texas was found to vary from a minimum of 0.02 ppm. to a max. of 2.78 ppm., the av. being 0.71 ppm., computed as As₂O₃ in terms of the total wet wt. of the individual fish. On the basis of dry wt. a minimum of 0.07 ppm., an av. of 3.54 ppm. and a max. of 14.2 ppm. were found. The ether-soluble portion of these fish constituted 2.49% of the total wet wt. and carried an av. of 11.8 ppm. of As, representing 22.8% of the total As in the fish. No correlation with the species of fish was noted. The detns. were made by the Cassil-Wichmann method.—M. M. Ellis.

14230. ESCHMEYER, R. W. (TVA). The catch, abundance, and migration of game fishes in Norris Reservoir, Tennessee, 1940. *Jour. Tennessee Acad. Sci.* 17(1): 90-115. Map. 1942.—As a part of an investigative program on Norris Reservoir to determine changes in the fishery and the biology of the reservoir with increase in age, a study was made in 1940 of the quality and quantity of the fishery and of the abundance and movements of adult game fish. According to 9,628 fishing records, representing about 7% of the total fishing, the catch averaged 1.2 fish per trip. Approx. 90% of the fish caught were game fish. The total number of fishing trips, based on periodic counts of fishermen, was about 137,900. The total catch of game fish in 1940 was 139,000 averaging 1.4 lbs. in wt. and representing

about 5.6 lbs. per acre for this 34,200-acre reservoir. The population of adult game fish present at the opening of the fishing season, based on the catch data and on information obtained from tagged fish, is estimated to have been about $\frac{1}{2}$ million. The yield represented $\frac{1}{4}$ of the available standing crop. Fish movements tended to be extensive, to vary with species, and to differ widely with individuals of the same species.—R. W. Eschmeyer.

14231. HERRE, ALBERT W. Undeveloped resources of the western Pacific north of the equator. *Proc. Sixth Pacific Sci. Congr.* 3: 437-440. 1939(1940).—The Clupeidae and allies are the most important group. They are already exploited to the limits of safety in Japanese waters, but elsewhere in oriental waters are not taken by modern methods. By the introduction of modern boats and methods immense quantities of Clupeidae, mackerels, tunas, anchovies, seer-fish, and Carangidae could be utilized. Another group of potential value is that of the sharks and rays. Other resources capable of much greater utilization are trepang, squid, shrimp, crabs, marine crayfish, sea mantids, oyster, and other shell fish. No use is made at present of the great numbers of porpoise in tropical waters. Oriental tropical waters contain vast quantities of edible fish, contrary to the belief of many who hold on theoretical grounds that they are deficient in fish life.—A. W. C. T. Herre.

14232. HEY, D. Some ecological factors affecting the fertility of trout eggs at the Jonkershoek Trout Hatchery. *Trans. Roy. Soc. S. Africa* 28(5): 453-470. 1 fig. 1941.—A low and fluctuating summer streamflow which increases the temp. of the ponds is an important factor in bringing about reduced fertility. The temp. of the water in the stock pond is well above the optimum for trout culture. By means of a special outlet in the settling pond, cooler water from the lower levels might be utilized in the stock pond with beneficial results. An improvement in the diet seems desirable. Silt brought down by the stream has a detrimental effect. Acidity of the water and O_2 content are not important factors at Jonkershoek. Rainbow Trout are better suited to the conditions than Brown Trout.—M. R. Levyns.

14233. HILE, RALPH, and FRANK W. JOBES. Age and growth of the yellow perch, *Perca flavescens* (Mitchill), in the Wisconsin waters of Green Bay and northern Lake Michigan. *Papers Michigan Acad. Sci., Arts and Lett.* 27: 241-266. 4 fig. 1941(1942).—Age detns. and the computation of individual growth histories from the examination and measurement of the scales of 752 yellow perch collected in Green Bay in 1932, 1934, 1937, and 1938 and of 276 perch taken in L. Michigan in 1937 failed to confirm the belief of commercial fishermen that the species grows more slowly in the bay than in the open lake. The av. calculated lengths of Green Bay yellow perch were generally greater than those of L. Michigan fish in the same yr. of life. The advantage of the Green Bay perch did not extend to growth in wt. since L. Michigan fish consistently averaged heavier than Green Bay perch of the same length (length-wt. curves of the 2 stocks were based on 938 specimens from Green Bay and on 294 from L. Michigan). In both localities the growth of perch was decidedly inferior to that reported previously for the sp. in Lake Erie and Saginaw Bay. In the 3d and later yrs. of life ♀ yellow perch of Green Bay averaged larger than ♂ (no sex data for L. Michigan perch). The min. legal total length of $7\frac{1}{2}$ inches was attained in approx. 4 yrs. Samples of the commercial catch were dominated by perch that had completed as few as 3 and as many as 5 growing seasons, with those that had completed 4 yrs. of growth making up 46% of the combined catch of all yrs. and fishing gears. The type of fishing gear and the size of mesh influenced greatly the age composition of the catch and also the determination of the av. size of the age groups. The sex ratio of the Green Bay yellow perch varied widely in the individual collections and was 356 ♀♀ per 100 ♂♂ in the combined collections for all yrs.—Ralph Hile.

14234. NEEDHAM, P. R. Production in inland waters. *Proc. Sixth Pacific Sci. Congr.* 3: 353-358. 1939(1940).—Production in inland waters is defined as "those fisheries products utilizable by man." Methods of measuring production are described as, (1) the creel census which is the principal method in use today, (2) poisoning with gases or

chemicals or dynamiting waters to determine total standing populations, (3) pumping short stretches of stream dry and (4) gill-netting or using electrical shocking devices to secure estimates of standing crops. The last named method has not proven successful. Complete catch records from creel census work have provided the best management data for fisheries administrators. Literature of the subject is cited to support this statement, with particular reference to trout waters. The application of production data to administrative fisheries problems is discussed and specific examples are cited to prove the value of such facts to efficient management of inland waters.—P. R. Needham.

14235. NIDEVER, H. B., and RICHARD S. CROKER. Boat-catch studies as an aid to inland fish management. *Proc. Sixth Pacific Sci. Congr.* 3: 359-361. 1939(1940).—A knowledge of the take is necessary in the management of fisheries resources. When the collection of complete catch records is not feasible, a measure of fishing intensity and changing abundance can be obtained from partial records. In the case of the California striped bass fishery the collection of records from rented skiffs and passenger fishing launches gives such a measure.—R. S. Croker.

14236. SCHOFFMAN, ROBERT J. (Fenwick High Sch., Oak Park, Ill.) Age and growth of the carp in Reelfoot Lake. *Jour. Tennessee Acad. Sci.* 17(1): 68-77. 1942.—Age determinations of 90 carp, *Cyprinus carpio*, were made by examining the scales for the presence of annular rings by the method of Schoffman (1938). The greatest wt. per length was attained during the 9th summer of life. The "law of growth compensation" does not apply to Reelfoot Lake carp and the total length-standard length ratios do not decrease progressively with an increase in length. During the early yrs. of life the length increased more rapidly than the wt., later the wt. increased more rapidly in proportion to the increase in length. Graphs are constructed to facilitate the conversion of standard length in mm. to total lengths in inches and vice versa, and of wt. in grams to wt. in ounces and vice versa.—R. J. Schoffman.

14237. SCHUCK, H. A. The effect of jaw-tagging upon the condition of trout. *Copeia* 1942(1): 33-39. 2 fig. 1942.—To obtain information on the growth of trout it has been a practice to identify individuals with a numbered jaw-tag and to weigh and measure these individuals over yearly periods. To determine if these tags have a deleterious effect upon the fish carrying them, or if the tagged trout could be assumed to be representative of the normal brown trout in New York State's Exptl. stream, the condition, or relative heaviness in respect to length of 2 groups of wild trout was compared by the analysis of covariance. When the mean wts. of the groups were compared on the basis of a mean standardized length, fish which had been tagged for 1 and 2 yrs. were found to be significantly lighter than were fish which had never been tagged. The mean difference between the tagged and untagged trout of mean length of 19.84 cm. was 4.89 grams, or 6.1% of the tagged wt. This figure is probably the best estimate of the effect of the tags on the relative wt. of these fish.—H. A. Schuck.

14238. SHAPOVALOV, LEO. (Stanford U.) The homing instinct in trout and salmon. *Proc. Sixth Pacific Sci. Congr.* 3: 317-322. 1939(1941).—Since 1937, considerable discussion has taken place regarding the existence of "homing" in salmon and trout, i.e., the return of spawning adults to the stream which they left as young fish. For many years previous to this, almost from the time that the probability of such a phenomenon existing was first expressed, the majority of biologists in the field had accepted homing in salmon as an established fact. The whole subject has been greatly clouded and complicated by the interjection of several distinct issues or problems, without their consideration in logical sequence. These problems may be stated in the form of the following questions: Does the phenomenon known as "homing" exist to any degree? If so, how much deviation (straying) exists? Under what conditions and circumstances does it operate? What is the mechanism by which it operates? What name should we properly assign to the phenomenon? The writer believes that the phenomenon does exist, that some straying takes place but is negligible, that the fish may travel great distances in the sea without getting "lost," that the mechanism of operation

is yet not clear, and that the phenomenon may properly be called a "homing instinct." It is quite possible that the instinct is more strongly developed in some species than in others and also that in certain races, subsp., or vars. of a given species it is more strongly developed than in others.

—Leo Shapovalov.

14239. TOWNSEND, LAWRENCE D., and DON EARNEST. The effects of low oxygen and other extreme conditions on salmonoid fish. *Proc. Sixth Pacific Sci. Congr.* 3: 345-351. 1939(1940).—Tolerance of low dissolved O_2 was tested in silver salmon fingerlings (*Oncorhynchus kisutch*) in pure artesian water of low O_2 content and in the same water with 1:1000 dilution of 1.05 sp. gr. waste sulfite liquor. Tests were conducted for 24 hrs. if fish survived, using continuous flows and dilutions through closed test vessels. Waste sulfite liquor interfered with utilization of O_2 at low tensions; 50% of fish survived in pure water having 1.50 ppm. dissolved O_2 , but 1.80 ppm. was necessary for survival in the waste liquor conc. used. The biochemical oxygen demand of the waste did not significantly alter the dissolved O_2 conc. during the test period. Re-use of water was shown to produce results indicating much higher values of the minimum tolerable O_2 content. The possibility was suggested that variations in exptl. methods have given rise to wide divergences in O_2 tolerances reported in the literature, with examples being given.—L. D. Townsend.

14240. VAN OOSTEN, JOHN. The age and growth of the Lake Erie white bass, *Lepibrama chrysops* (Rafinesque). *Papers Michigan Acad. Sci., Arts and Lett.* 27: 307-334. 4 fig. 1941(1942).—Age and growth determinations were based on 1,869 fish; length-wt. relationship on 4,904 specimens—all taken in commercial impounding nets. Direct-proportion calculated lengths were corrected for differential growth of body and scales by a formula. Age groups 0 to VII were represented but only 4.7% of the fish were older than 3 yrs. Age groups I and II dominated. The 1926 year class was particularly numerous. 87% of the fish varied between the 7- and 11-inch length interval, and about 62% were below the legal size limit (9 in.). The season's growth was completed by mid-Oct. No significant differential growth was apparent between sexes or localities, but was evident between year classes. Growth in length followed a typical curve; the greatest increment in wt. occurred in the 3d year. Compensation in growth occurred in the 3d year. An equation was developed to express length-wt. relationship, and length-conversion factors are presented. The coefficient of condition (K) did not vary significantly with the sexes, age groups, localities, calendar years, or months of the growing season, but did vary with length; its value is high (2.37). The sex ratio was approx. 50:50, although the % of ♀♀ increased with age. The majority of the fish began to spawn at the age of 3 yrs. when 11 inches, total length. Males started spawning in the 2d yr., 1 yr. earlier than the ♀♀. Between 23 and 69% of the fish taken legally have never spawned. On the basis of growth and sexual maturity a legal size limit of 11 in. is recommended.—Author.

WILDLIFE MANAGEMENT—TERRESTRIAL

(See also Entries 14189, 15160, 15176, 15179, 15563)

14241. ALLEN, DURWARD L. (*Dept. Conserv., Lansing, Mich.*) Populations and habits of the fox squirrel in Allegan County, Michigan. *Amer. Midland Nat.* 27(2): 338-379. Map, 13 fig. 1942.—A 2-yr. study of the fox squirrel (*Sciurus niger rufiventris*) was made in scrub oak woodland in southwestern Michigan. An estimate based upon returns from box-trapping and tagging placed the 1938 fall population at about 1 animal per 3 or 4 acres of woodland. In the following yr. they had increased, possibly by 20-30%. Fox squirrels use either hollow trees or leaf nests for winter habitation and for rearing their young. During the 2 yrs. sexual activity was greatest in late Jan. and most of the young were born in Mar. Another fairly definite breeding period occurred in June and July, although a few animals bred in late spring. Old ♀♀ apparently produce 2 litters

per yr. and yearlings only one. The mean number of young in 51 litters was 2.92. The most conspicuous mortality factor, aside from hunting, was a mange-like condition associated in at least some cases with an infestation of seab mites (*Sarcoptes*). The disease causes a loss of hair, emaciation, and in some cases results in death. Predation probably is not an important cause of mortality in this region. The yr-round average wt. of fox squirrels was 766 grams, or 1 lb. 11 oz.; ♀♀ averaged 10 g. heavier than ♂♂. The max. wt. was reached in the fall and the min. in late winter. In a creek-bottom habitat squirrels had more belly fat than upland animals in the fall of 1937.—D. L. Allen.

14242. EYLES, MARY STIPE. (*Memphis, Tenn.*) Plants of Reelfoot Lake with special reference to use as duck foods. *Jour. Tennessee Acad. Sci.* 17(1): 14-21. 1942.—Lists are given of aquatic plants in or around Reelfoot Lake that have or might have any value as duck foods. Each plant is evaluated according to information on its use as duck food elsewhere and its abundance on the lake. A chart compares the abundance on the lake and the value as duck food of the most important Reelfoot Lake plants. This indicates that very likely *Ceratophyllum demersum*, the duck-weeds (*Wolffia*, *Lemma*, and *Spirodela*), *Taxodium distichum*, *Cephalanthus occidentalis*, and *Persicaria hydro-piperoides*, are the most important duck foods on the lake. Analyses of contents of duck stomachs from the lake might present data which would alter this conclusion.—M. S. Eyles.

14243. GRIMMER, W. F. Food habits of the pheasant in Wisconsin. *Wisconsin Conserv. Bull.* 5(4): 10-13. 1940.—Results of a survey of the diet of ringneck and allied species of pheasants in Wisconsin show that these animals are important destroyers of weed seeds and harmful insects. Selected typical reports show grasshoppers to be the chief animal food, in some cases making up the total crop content of the birds. Weed seeds such as poison sumac, mustard, bitter-sweet, plantain, and others in smaller quantities were eaten along with berries and some cultivated grains.—Herbert McCullough.

14244. MCCLURE, H. ELLIOTT. (*Iowa State Coll.*) Ecology and management of the mourning dove, *Zenaidura macroura* (Linn.), in southwest Iowa. *Iowa State Coll. Jour. Sci.* 16(1): 93-95. 1941.—Abstract of a doctoral thesis.

14245. MILLER, J. PAUL, and BURWELL B. POWELL. (*U. S. Dept. Agric.*) Game and wild-fur production and utilization on agricultural land. *U. S. Dept. Agric. Circ.* 636. 1-58. 10 fig. 1942.—Based on 3,000 personal interviews throughout the U. S. in 1936 and 1937 with representatives of every state land-grant college, game department, and numerous other agencies and individuals directly or indirectly interested in the problem, the authors report that 85% of the game and wild fur in the U. S. was produced and harvested on agric. lands and that hunting pressure varies from one license to every 34 acres to one license to every 12,000 acres of potentially huntable land. Production of game seldom exceeds one unit of harvestable game per 4 acres. Much of the existing agric. land (probably 75%) could be economically improved in such a manner as to benefit wildlife, providing adequate incentives are afforded land operators. The weakness of most farm game programs is their failure to recognize the land operator's position, the low production potentialities, and the uneven distribution of hunting pressure. Under present conditions, only a few opportunities exist for land owners to realize a monetary return commensurate with the effort and expense involved in the production and utilization of game and wild fur on agric. lands. Such instances are generally confined to lands suitable only for extensive types of agriculture or to lands totally unsuited for agric. use. Game and fur farms have not generally proved remunerative ventures as a supplementary farm enterprise. The value of wildlife, great as it is, lies principally in the social, esthetic and recreational uses.—J. P. Miller.

BIOLOGICAL ABSTRACTS

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GENERAL BIOLOGY

Editors: A. H. GRAVES, *Plant*; C. A. KOFOID, *Animal*

(See also Entries 15725, 15736, 15740, 15917, 15919, 17267)

PHILOSOPHY OF BIOLOGY

15712. KORZYBSKI, ALFRED. (*Inst. Gen. Semantics*, Chicago.) Science and sanity: An introduction to non-aristotelian systems and general semantics. 2d ed. lxxi + 798p. Illus. Science Press Printing Co.: Lancaster, 1941. Pr. \$6.—General Semantics involves a critique of the present content of the natural sciences. The more rigorous mental discipline of the sciences with its use of carefully defined concepts in accordance with logical principles (as in mathematics), has been superposed upon a primitive, pre-scientific language in which terms are neither rigorously defined nor consistently used in a pre-defined single sense; many of the expressions of our every-day language contain hidden pre-suppositions that would be rejected if explicitly stated. These semantic abuses are of many kinds; one kind, stressed throughout this book, consists in the use of "elementalistic" expressions (viz., those that inexplicitly imply a separation into faculties or aspects that do not correspond to external realities; as, "mind," "body," "intellect," "emotion," "space," "time"); for these, "non-elementalistic" terms should be substituted (as, space-time). Much of the harm stems from the Aristotelian school (though Aristotle, himself, was not as strict an "Aristotelian" as some of his followers). "Psycho-logically," Aristotle was a typical extrovert, who projected all his internal processes on the outside world and objectified them: so his reaction against Plato, the typical introvert, for whom 'reality' was all inside, was a natural and rather an inevitable consequence. The struggle between these two giants was typical of the two extreme tendencies. . . . Either of these extremes in our make-up is undesirable and un-sound, in science as well as in life." Just as the mathematical studies of Gauss, Lobachevski, Bolyai, Reimann and Einstein resulted in the generalization of Geometry by denial of the necessity of some of Euclid's postulates, and just as modern physics has achieved progress by breaking some of the limitations of Newtonian physics, so the great task of General Semantics is to develop a non-Aristotelian concept of the universe—a task that this book attempts.—If we merely "used" Aristotelian, elementalistic terms, without thought or nervous system being affected thereby, the harm would not be so great; in fact, the words and the thought-habits that we acquire in infancy—and these are largely words and thought-habits that the race acquired in its infancy—are formative factors in the development of the brain and the organism generally, as well as of our system

of knowledge; much of the "mental" illness, and of the "physical" illness as well, of the modern world is due to maladjustments of this origin. "The structure of our old languages has shaped our [semantic reaction] and suggested our doctrines, creeds [etc.], which build our institutions, customs and habits. . . ."—The literature cited in the extensive bibliography (619 references) is largely from biology; knowledge of neurology and psychiatry is suggested as basic to philosophy; a chapter on "The Organism as a Whole" develops the Holistic basis of Korzybski's thought. Another chapter discusses colloidal behavior as the ultimate basis of an understanding of the natural order.

15713. LILLIE, RALPH S. (U. Chicago.) The problem of synthesis in biology. *Philosophy of Sci.* 9(1): 59-71. 1942.—Regarding the integrative processes of living organisms as highly evolved instances of a type of concrescence which everywhere pervades nature, and considering special acts of human creation as having their foundation in factors common to all instances of natural integration, the conclusion is reached that the sharp separation of physical and psychical is not possible to a comprehensive theoretical biology. In biol. synthesis physical action takes on special forms which in many cases imply a psychic background and direction. For the solution of the fundamental problems of biology it seems necessary that the physiological and the psychological study of living organisms should proceed hand in hand.—L. J. Lafleur.

15714. NORTHRUP, F. S. C. (Yale U.) Causality in field physics in its bearing upon biological causation. *Philosophy of Sci.* 5(2): 166-180. 1938.—Commencing with a review of the concept of causality and the form which causality takes in particle and in field physics, the paper proposes the applicability of field physics, at present holding a preferred position

in physics itself, to biological phenomena. This hypothesis immediately gives an exptl. and verifiable basis for the apparent unity of organisms which is certainly preferable to the purely intuitive and mystic conceptions which have previously been the only alternative to a particle-mechanism. In addition, the present hypothesis is directly fruitful and has been in part verified. Bibliography included.—L. J. Lafleur.

EXPLORATIONS, EXPEDITIONS, ETC.

15715. BEEBE, WILLIAM. Book of bays. xviii + 302p. Frontispiece, map, 33 fig. Harcourt, Brace and Co.: New York, 1942. Pr. \$3.50.—Mr. Templeton Crocker, owner, with

artists and scientists of the New York Zool. Society, cruised in the yacht "Zaca" from Nov. 1937 to Apr. 1938, travelling from San Diego, Calif., to Colombia (S. America). They collected and observed in shallow marine habitats at about 22 stations en route, chiefly in the bays of the west coast of Mexico and Central America, and on islands near shore. The natives of the seashore villages are quaint. Sea-elephants are in danger of extinction. Invertebrates of many sorts are magnificently beautiful. Fish come in great numbers to underwater night-lights. A fascinating variety of bird life abounds on shore.—*M. W. de Lovenfels*.

15716. HOWELL, JOHN THOMAS. (*California Acad. Sci., San Francisco.*) Hugh Cuming's visit to the Galapagos Islands. *Lloydia* [*Cincinnati*] 4(4): 291-292. 1941.—Confusion exists in the literature and on botanical specimens as to the date of Hugh Cuming's visit to the Galapagos Is., it being variously given as 1829, 1831, and 1832. It is concluded that the visit of the famous English naturalist and collector to the islands was made in 1829. The islands in the Galapagos Archipelago visited by him are listed. References are given to the literature dealing with Cuming's extensive travels in the Philippines and S. Pacific.—*J. T. Howell*.

MISCELLANEOUS

15717. ADVISORY BOARD FOR MEDICAL SPECIALTIES. [Compiled by.] Directory of medical specialists. Certified by American Boards, 1942. 2d ed. xvi+495p. Columbia University Press: New York, 1942. Pr. \$7.—For general description of the book see abstract of the 1st edition (B.A. 14(10): entry 15632). 18,000 Diplomates are mentioned; the information about each is more complete than in the earlier edition. The information contained makes this book a valuable index to a trend in medical development—one which has grown more than 25% in the last 2 yrs. A separate section is devoted to each American Board, with both a geographic and a biographic listing of its Diplomates. In addition, there is a complete alphabetic list of all the Diplomates, containing addresses and indications of specialty certification. The organization and examination requirements of each of the American Boards are explained in full.

15718. BROWN, CHARLES BARRETT. The contribution of Greek to English with special attention to medical and other scientific terms. xiii+310p. Vanderbilt University Press: Nashville, 1942. Pr. \$2.50.—An etymology of the words of Greek origin among the 100,000 English words of most common use conveniently arranged by the Greek root, under which are entered the dependent English terms. Especial emphasis has been placed on scientific terminology, particularly in medicine, biology, zoology and botany. This book should prove an indispensable reference work for those interested in the development of scientific terms as it gives meaning and significance to the language of the sciences. A companion volume, the Contributions of Latin to English, will be issued at an early date.—*E. R. Cunningham*.

15719. CROCKETT, CHARIS. The house in the rain forest. [With an introduction by EARNEST A. HOOTON.] x+300p. 16 pl. Houghton Mifflin Co.: Boston, 1942. Pr. \$3.—This is an informal but well-written account of life among the cannibals of New Guinea. The author and her husband, sent out by the Philadelphia Academy of Natural Sciences to obtain anthropological data, made about 120 measurements on each of nearly 900 cannibals, and the present book records the lighter side of this process. In addition to the anthropological data dealing with the little-known Madik and Moraid the book sheds interesting sidelights on the flora and fauna of the region, many of the latter having served at one time or another as the author's pets.—*Marjorie Gerken*.

15720. GARRETT, HENRY E. Great experiments in

psychology. Rev. and enlarged ed. xxi+452p. 14 pl. 47 illus. D. Appleton-Century Co., Inc.: New York, 1941. Pr. \$2.50.—This is a thoroughgoing revision of a well-known and widely used supplementary textbook, based on classical expts. in psychology. Approx. 100p. of new materials, including a new chapter on personality, have been added. Each of the 15 chapters begins with a concise introduction to a fundamental problem of general interest to students of psychology; this is followed by an epitome of one or more classical expts. bearing on the problem, which in turn is supplemented by recent expts. The chapters most extensively revised deal with intelligence, learning, individual differences, gestalt psychology, and physiological psychology. New diagrams and portraits of eminent men add respectively to clarity of exposition and interest-value.—*C. P. Stone*.

15721. LINTZ, GERTRUDE DAVIES. Animals are my hobby. 301p. Frontispiece, 12 pl. Robert M. McBride and Co.: New York, 1942. Pr. \$2.75.—This is the popular story of a woman who specialized in pedigree Saint Bernard dogs, and reared in her own home 16 great apes; chimpanzees, orangs, and 3 young gorillas (including Gargantua). It presents a dramatic picture of their almost human affection and out-reaching but limited psychology. Their frantic instinct for survival when suddenly frightened is alarmingly portrayed. Included are notes on pure-bred pigeons, great horned owls, the leopard, and a giant lizard.—*C. A. Kofoid*.

15722. TWOMEY, ARTHUR C. (in collaboration with NIGEL HERRICK). Needle to the north. The story of an expedition to Ungava and the Belcher Islands. vii+360p. 40 pl. Houghton Mifflin Co.: Boston, 1942.—This account of an expedition to Ungava and the Belcher Islands is replete with information concerning the climate, geography, fauna and flora, and the native Indians and Eskimos and how they live. The vigorous search for the *kasagea*, the Ungava fresh water seal, is described. During the sojourn among the Eskimos of the Belcher Islands, the sudden transition from the long, severe winter to the brief sub-Arctic spring and summer was observed. The Clearwater Lake country represents a transition region between the northern treeland and the Arctic tundra. On the high rolling plateaus of climax tundra, *Cladonia* is the dominant plant accompanied by Arctic willow, Labrador tea, blueberry, cranberry, and crowberry shrubs growing in the more moist places with sphagnum and baked-apple plants. In the low, moist areas small black spruces occurred as a subclimax, and in a few places tamaracks grew near the muskegs and ponds. On the climax ridges there were some sedges and andropogons. Flocks of rock and willow ptarmigan were encountered; also Hudsonian chickadees, Canada jays, and red polls. True tundra occurs throughout the rocky Belchers with dwarf birches, Arctic willows, *Dryas*, *Rhododendron*, and cotton grass. Here was an abundance of bird life including pipits, snow birds, snowy owls, geese, eider ducks, squaw ducks, herring gulls, glaucous gulls, Arctic terns, jaegers, plovers, purple sandpipers, semi-palmated sandpipers, least sandpipers, horned larks, guillemots, Arctic loons, white-winged scoters, and surf scoters. Foxes, lemmings, and seals were abundant. The story of the walrus hunt gives a detailed account of how these animals are taken.—*P. D. Strausbaugh*.

15723. YEARBOOK STATISTICAL COMMITTEE. Agricultural Statistics, 1941. 731p. U. S. Department of Agriculture: Washington, 1941. Pr. \$75.—This volume is an assembly of the statistical material formerly (until 1935) included in the *Yearbook* of the Dept. of Agriculture. The statistics presented deal with: Acreage, yield, and production of crops; commercial crops; prices received by farmers; livestock production; market supplies and prices; imports and exports; other statistics, and weights and measures.

BIOGRAPHY, HISTORY, AND BIBLIOGRAPHY

Editors: CARROLL W. DODGE, EILEEN R. CUNNINGHAM, T. C. RUCH, JUDITH W. HUNT

(See also B. A. 16(6): Entries 14115, 14594, 15076; and in this issue 15718, 16184, 16527, 16636, 16967)

HISTORY

15724. BAYON, H. R. The significance of the demonstration of the Harveyan circulation by experimental tests.

Isis 33(4): 443-453. 1941.—Why was the discovery of the circulation of the blood completed by an English physician and why was it deferred until the 17th century? The answer

to this question is sought in a renewed examination of documents in the British Museum and the Bodleian, Oxford, with a study of the writings of Harvey and his contemporaries, revealing the state of knowledge before, during, and after Harvey's time, which is described. It seems that Galen's description of the to-and-fro movement of the blood was accepted so long because it was easily understood and agreed with appearances; and the movement of the blood was not considered of vital significance. As late as 1559 Realdo Colombo first printed the observation that insensibility could be produced by pressing the carotid arteries. Bartolomeo Eustachio (1563) was the first who displayed a proper understanding for anatomical comparisons and homologies. The description and acceptance of the Harveyan circulation were delayed until the middle of the 17th century because it was then that accurate comparative anatomical observations first became available through wood-cuts and printed works, together with the practice of dissection. The circulation was convincingly demonstrated by Harvey (1628) because he made intelligent use of the exptl. method to test and control his interpretation of clinical observations and comparative anatomical notes.—R. P. Bigelow.

15725. EMERY, CLARK. (*Indiana U.*) Scientific theory in Erasmus Darwin's *The Botanic Garden* 1789-91. *Isis* 33(3): 315-325. 1941.—The book is in 2 parts—"The Economy of Vegetation" and "The Loves of the Plants." The first part is in 4 cantos covering in text and footnotes a wide variety of scientific material, from meteors to plant physiology. A list of the more important subjects is given, those of biol. interest including: luminous insects, buds and bulbs, animal fibres, coral formation, the ship-worm, the embryo in the seed, plant diseases, and several aspects of vegetable physiology. In one passage is asked, "Do some animals change their form gradually and become new genera?" The second part sets out to demonstrate Linnaeus's system of botany.—R. P. Bigelow.

15726. GORDON, MAURICE BAER. Medicine among the ancient Hebrews. *Isis* 33(4): 454-485. 1941.—A thorough search through writings of the Hebrews before the birth of Jesus, chiefly the Old Testament and the Apocrypha, reveals considerable medical knowledge. This includes such biological topics as sex, anatomy, animal parasites, and infectious diseases. All statements are supported by quotations or references in footnotes to original sources.—R. P. Bigelow.

15727. GRAS, N. S. B. A history of agriculture in Europe and America. 2d ed. 496p. F. S. Crofts and Co.: New York, 1940.

15728. McDANIEL, W. B. 2d. (*Coll. Phys. Philadelphia.*) An hermetic plague-tract by Johannes Mercurius Corrigiensis. Text, translation and biobibliography of the author. II. Biobibliography. *Trans. and Stud. Coll. Phys. Philadelphia* 9(4): 217-225. 1942.—The works attributed to Johannes Mercurius Corrigiensis and the important references to him in the literature are briefly described in chronological order and the pros and cons of the controversy re the possible identity of Lodovicus Enoch Lazarellus and Johannes Mercurius Corrigiensis are discussed. A bibliography of works attributed to Johannes Mercurius Corrigiensis and of references to him is appended. A translation of the description by Trithemius of the sojourn of Johannes in Lyons is included.—E. S. Moore.

15729. NEUSTÄTTER, OTTO. Where did the identification of the Philistine plague (I Samuel, 5 and 6) as bubonic plague originate? *Bull. History Med.* 11(1): 36-47. 1941.—Until the appearance of the so-called Revised Version of the Bible in 1885 the Philistine plague was defined officially as "emerods," an antiquated term for hemorrhoids. The Revised Version substituted the word "tumors," which, though philologically correct, makes no sense from the viewpoint of medicine. Tumors do not produce symptoms such as are described in I Samuel, 5-6. The earliest determined advocate of bubonic plague as the correct diagnosis is Thenius whose work antedates the Revised Version by some 50 yrs. It is very likely, although it cannot be definitely proved, that Thenius derived his opinions from the *Physica sacra* of J. J. Scheuchzer, which first appeared in German in 1725.—Sister M. E. Keenan.

15730. ROUSSEAU, JACQUES. *La Botanique canadienne*

à l'époque de Jacques Cartier. *Contr. Lab. Bot. Univ. Montréal* 28: 1-86; Also in: *Ann. Acfas* 3: 151-236. 1937.—Excerpts from the original editions of the diaries of Jacques Cartier and other discoverers, containing notes pertaining to Canadian botany, are cited and discussed. Explorers other than Jacques Cartier whose works have been analyzed from a botanical viewpoint are: Roberval, Jean Alfonse, André Thévet, Jacques Noël, Jean Cabot, Gaspar Cortereal, Verrazzano, etc. A short chapter is devoted to Norsemen's travel to Vinland. The paper ends with an annotated list of all plants mentioned in the discussion of the discoverers' texts.—Author.

15731. SARTON, GEORGE. (*Harvard U.*) The earliest reference to fossil fishes (1253, 1309). *Isis* 33(1): 56-58. 1941.—The earliest known reference to fossil fishes is by Jean de Joinville, *Histoire de Saint Louis*, 1309, §602. It refers to a fossil obtained by Louis IX at Sidon on the Syrian coast in 1253. Joinville saw it and likened it to a tench (*Tinca vulgaris*). A list is given of the Pre-Linnean references in Dean's *Bibliography of Fishes*. Only one of these, *Athenaeos*, ca. 200, is anterior to Joinville, and that one is based on an erroneous translation. The ancients did not speak of fossil fishes and had no knowledge of Crossopterygian or Dipnoan fishes.—R. P. Bigelow.

15732. SARTON, GEORGE. (*Harvard U.*) History of the practical measurement of blood pressure. *Isis* 33(2): 243-245. 1941.—The first measurement of arterial blood pressure was made by Stephen Hales and recorded in 1733. Experiments followed by Magendie in 1828, by Carl Ludwig and by Karl Vierordt in 1850, and we have the cardiograph of Etienne Jules Marey (1861) and the sphygmomanometer of von Basch (1878). The first general use of blood pressure apparatus in hospital wards appears to have been by Harvey Cushing, 1901-02, recorded in 1903 (*Boston Med. & Surg. Jour.*, 148, 250-256). The first records in the medical wards of the Mass. General Hospital were in 1908-10, a new illustration of the inertia which so often delays the application of great discoveries.—R. P. Bigelow.

15733. THAU, WILLIAM. Purkyně: A pioneer in ophthalmoscopy. *Arch. Ophthalmol.* 27(2): 299-316. 8 fig. 1942.—John Evangelist Purkyně (1787-1869), one of the greatest biologists of all times, discoverer of the germinal vesicle and author of the term "protoplasm," was the first to see the eye-ground in both animals and men. Even authorities on Purkyně have always credited Helmholtz with the establishment of the principle of ophthalmoscopy; actually it was Purkyně who had established that principle 30 yrs. before Helmholtz, and the latter's invention and construction of the eye-mirror and of the ophthalmometer, as well as his theory of accommodation, are based on the results of Purkyně's investigations. Both the original Latin text and the English translation of the excerpt dealing with Purkyně's observation of the eye-ground are reproduced. Purkyně's principle of ophthalmoscopy led to the invention of the eye-mirror, the throat-mirror (introduced by his assistant Czermak) and all the other diagnostic aids serving for the examination of body cavities.—William Thau.

15734. ZIRKLE, CONWAY. (*U. Pennsylvania.*) The jumar or cross between the horse and the cow. *Isis* 33(4): 486-506. 1 fig. 1941.—Beginning with Aristotle, strange animals in unexplored Africa were explained as crosses between known forms of diverse aspect. The first mention of an ass-bull hybrid was by the theologian, Pierre Bercheur (1362), explaining the "onocentauros" mentioned by Isaiah. Later, however, a similar cross was said by many noted men to be not uncommon in France. The mule out of a mare by a bull was first mentioned by Jerome Cardan in 1546. Conrad Gesner (1551) was the first to use the name "jumar" for this hybrid, which was vouched for by 3 other famous savants of the 16th century. 9 authors refer to the jumar in the 17th century, one giving an eye-witness account with a figure. There are numerous references in the 18th century. Buffon (1767) doubted the possibility of this hybrid, as did Haller (1766) and J. F. Blumenbach (1775). But the jumar was defended by Charles Bonnet (1762 and later) and by many others, some with details of dissections. The hybrid was described as like a small mule but with projecting lower jaw and vestigial horns. The Encyclo-

pédie, 1780, dismissed the jumar as fabulous and L. M. Caldani asserted in 1803 that there was no authentic case of the impregnation of a mare by a bull or of a cow by a stallion, and that the animals called jumars were small asses. Thus ended serious discussion of a myth that had been accepted for more than 250 years.—R. P. Bigelow.

BIBLIOGRAPHY

15735. BOLETIN del INSTITUTO de INVESTIGACIONES VETERINARIAS. Volume 1, Number 1, January 1942. Irregular. 46 pages. 1 article. Published by the Institute of Veterinary Investigation, Caracas, Venezuela.—This bulletin is devoted to the publication of papers by the staff of the Inst. for Veterinary Research. It is distributed free of charge, but the exchange will be appreciated. The present issue is comprised of a single article:—Estudios inmunológicos sobre la pluralidad de los virus rágicos en Venezuela [Immunological studies on the plurality of rabies viruses in Venezuela] by VLADIMIR KUBES y FRANCISCO GALLIA.

15736. HULL, CALLIE, et al. (compiled by.) Handbook of scientific and technical societies and institutions of the United States and Canada. *Bull. Nat. Res. Counc.* 106. 1-389. 1942.—This edition (the 4th) contains data for 1269 organizations for the U. S. and its dependencies (including Hawaii, Puerto Rico, the Panama Canal Zone, and the Philippine Is.), and 143 organizations for Canada. Indexes to both the U. S. and the Canadian sections provide a subject classification of the activities, purposes, and research funds of the societies and institutions, the periodicals mentioned, and changes of name in societies and institutions as reported in each case under the heading "History." A personnel index has been added to this edition for the officers of the organizations included.

15737. LANCASTER-JONES, E., and B. K. JOHNSON. (*Imp. Coll., London.*) The application of microfilm to records of scientific literature, and a suitable projection apparatus for viewing such records. *Proc. Phys. Soc. [London]* 53(2): 191-195. 3 fig. 1941.—The advantages and drawbacks of microfilm are discussed. A design for a simple and cheap microfilm "reader" is given.—I. Fankuchen.

15738. PROCEEDINGS OF THE ARKANSAS ACADEMY OF SCIENCE. Volume 1, 1941. Editorial Board: DWIGHT M. MOORE, editor, HUGH H. HYMAN, M. J. McHENRY, and T. L. SMITH. Annually. 78 pages. 17 articles. Published by the Arkansas Acad. of Science, Univ. of Arkansas, Fayetteville. Subscription price \$1. (To members: \$50.)

15739. ROUSSEAU, JACQUES, MARCELLE GAUVREAU, et CLAIRE MORIN. Bibliographie des travaux botaniques contenus dans les "Mémoires et Comptes rendus de la Société Royale du Canada," de 1882 à 1936 inclusivement. *Contr. Inst. Bot. Univ. Montréal* 33. 1-117. 1939.—A catalogue of 306 botanical papers, classified according to author names, each title being accompanied by a complete list of plant names mentioned therein. The catalogue is followed by an analytical summary, and an exhaustive alphabetical index to genera, spp., vars. and forms mentioned in each and every paper.—Jacques Rousseau.

15740. SMITH, HOBART M. (U. Rochester.) The publication dates of "La Naturaleza." *Lloydia* [Cincinnati] 5(1): 95-96. 1942.—The dates of publication and pagination of all separately published sections of the 11 volumes of La Naturaleza are given.—H. M. Smith.

15741. UNITED STATES DEPARTMENT OF AGRICULTURE. List of Farmers' Bulletins that have been superseded and the Farmers' Bulletins or other publications superseding them. 12p. U. S. Dept. of Agriculture: Washington, 1942.

BIOGRAPHY

15742. McALLISTER, ETHEL M. Amos Eaton: Scientist and educator. xiii + 587p. Frontispiece, 7 pl. University of Pennsylvania Press: Philadelphia, 1941. Pr. \$5.—This is the most complete biography of Amos Eaton, 1776-1842, scientist, educator, lawyer and land agent, that has been written. It covers all phases of his life, including a disastrous interval which other biographies have overlooked. The 24 chapters are grouped into 4 parts. Part 1, 66pp., "The Family Circle," covers the early genealogical history of his family, dating from 1603 to 1776, his early life and education in New England, and his own 4 marriages and offspring from these. Part 2, 88pp., entitled "Early Business Trials," deals with the period from 1799 to 1815. It concerns his training and transactions as lawyer and land agent, his misfortune in becoming a victim of unscrupulous and powerful men who engineered charges of fraud and forgery against him. Because of these he was ruined financially, imprisoned unjustly and served 4 years of his life-sentence before being pardoned. In prison he turned to science more earnestly. Part 3, 203pp. "Scientific Contributions," deals with the period from 1816 on, and concerns his training, contacts, publications, his years of struggle as an itinerant lecturer and teacher of sciences, his very successful attempts to popularize botany, chemistry, mineralogy, geology and zoology and his efforts to encourage experimentation, observation and collection of specimens. Part 4, 160pp., "The Rensselaer Period," 1824-1842, covers the germination and fruition of Eaton's ideas of a new system of education. It describes the founding and growth of the Rensselaer School, now the R. Poly. Inst., where students could "learn by doing." Natural sciences were taught by the laboratory, and the exptl. methods. Stress was placed on training teachers of the natural sciences. Eaton's many practical textbooks in Botany, Chemistry, Geology and Zoology aided greatly. His life was devoted to training others to carry on his liberal and advanced ideas in science. He believed in coeducation and a like education for men and women. His efforts to establish a preparatory school and branch schools met with success. The very extensive bibliography, 55pp., is drawn from manuscripts, innumerable letters, public records, newspapers, legal documents, scientific publications, etc. The index is 9 pp.—M. D. Rogick.

15743. SARTON, G. Brave Busbecq (1522-1592). *Isis* 33(5): 557-574. 7 fig. 1942.—A summary of the life and accomplishments of Ogier Ghiselin de Busbecq, scholar, diplomat and naturalist, who, among other accomplishments, introduced into Europe from Turkey the lilac, horse-chestnut, and tulip, as well as securing for the Imperial Library in Vienna, among other manuscripts, the *Monumentum ancyranum* and the *Codex Aniciae Julianae* (*Codex Vindobonensis*). "Few men of his age, and no diplomat of any age, have done so much to earn our gratitude. And yet—just imagine it—the most elaborate histories of science do not speak of him, they do not even mention him!"—E. D. Merrill.

CYTOLOGY

Editors: R. E. CLELAND, *Plant*; C. E. McClung, *Animal*

(See also Entries 15775, 15880, 16087, 16563, 16839, 16840, 16844, 16848, 16853, 16868, 17064, 17196, 17199, 17217, 17304)

GENERAL

15744. CASPERSSON, T. Über die Rolle der Desoxyribosenucleinsäure bei der Zellteilung. *Zeitschr. Zellforsch. u. Mikrosk. Anat. Abt. B: Chromosoma: Zeitschr. Zellkern- u. Chromosomenforsch.* 1(1): 147-156. 1938.—It has previously been shown that in nuclei with a low nucleic acid content there is an increase of nucleic acid during prophase. The increase takes place in the chromosomes. The total amt.

of nucleic acid was measured during the different stages of meiotic prophase in single living cells of *Gomphocerus*, by determining the total absorption in the cells of u-v. light of 2570 Å, using a photoelectric cell. The amt. of nucleic acid increased before mid-leptotene, and then remained constant until diplotene. This does not support the hypothesis of a direct correlation between nucleic acid synthesis and chromatid contraction. As desoxyribose-

nucleic acid is found exclusively in the chromosomes, and is present in large amounts before cell division, at the time at which gene reduplication presumably takes place, a correlation between these 2 phenomena seems probable.—E. Sutton.

15745. DARLINGTON, C. D., and M. B. UPCOTT. The measurement of packing and contraction in chromosomes. *Zeitschr. Zellforsch. u. Mikrosk. Anat. Abt. B: Chromosoma: Zeitschr. Zellkern- u. Chromosomenforsch.* 1(1): 23-32, 2 fig. 1939.—Observations on approximate chromosome lengths are given—the greatest range of extension being between diakinesis or 1st metaphase of meiosis and the salivary gland chromosome of *Drosophila*, a range of about 1:300. The factor of linear contraction varied from 4.50 in a number of spp. tabulated. The changes in length are consistent with the observations of coiling in mitosis and meiosis. The ratio of chromatid diam. to thread diam. ranging from 1.8:1 to 2.5:1. Further measurements of the type given may enable us to distinguish between the different assumptions regarding the method of "packing" and the internal changes correlated with spiralization.—E. R. Sansome.

15746. SCHRADER, F. The structure of the kinetochore at meiosis. *Zeitschr. Zellforsch. u. Mikrosk. Anat. Abt. B: Chromosoma: Zeitschr. Zellkern- u. Chromosomenforsch.* 1(2): 230-237, 6 fig. 1939.—Reexamination of the 1st meiotic division of *Amphiuma*, *Plethodon*, *Tradescantia* and *Zeia* has shown that the difference in structure of the kinetochore of these Amphibia and plants is not basic, but may be the result of a difference in the amount of resistance which the chromosome offers in meiotic movement. In *Amphiuma* and *Tradescantia*, the spindle spherule is clearly seen to be divided in late prophase of this division. The kinetochore is compound, comprising spindle spherule and commissural cup; functional fragments of the kinetochore may therefore be supposed to originate before this final structure is completely organized.—K. S. Brehme.

PLANT

15747. BALDWIN, J. T. Jr. (U. Michigan.) Polyploidy in *Sedum ternatum* Michx. II. Cytogeography. *Amer. Jour. Bot.* 29(4): 283-286. 1942.—Four chromosome-number races of *S. ternatum* are known in the wild: diploid ($2n=16$), triploid, tetraploid, and hexaploid. Geography of the races was detd. on the basis of cytological study of 71 collections of plants from representative points in the specific area. The diploid, and supposedly primitive, race (11 collections) was found in a restricted region in W. Virginia, Kentucky, and Virginia. The tetraploid (57 collections) is widespread and radiates from the limited region of the diploid as a center. The triploid (2 collections) seemingly has a discontinuous distribution; it was found in W. Virginia near both the diploid and tetraploid races and in N. Carolina where both these other races may be expected. The hexaploid (1 collection) was found near Tuscaloosa, Alabama, at the southern edge of the specific range and in the vicinity of the tetraploid race. The several races are apparently not genetically isolated, indications being that the triploid arises through natural hybridization. All the races can maintain themselves vegetatively. Specimens of *S. ternatum* from different localities often differ much, but it has not been possible, except by cytological means, to draw ready lines of separation between the polyploid races.—J. T. Baldwin, Jr.

15748. GEITLER, LOTHAR. Kernwachstum und Kernbau bei zwei Blütenpflanzen. *Zeitschr. Zellforsch. u. Mikrosk. Anat. Abt. B: Chromosoma: Zeitschr. Zellkern- u. Chromosomenforsch.* 1(4): 474-486, 6 fig. 1940.—Nuclear size and chromosome volume were compared in n , $2n$ and $4n$ cells from various tissues of *Rhoeo discolor*. A variation in nuclear size occurred independently of the variation in number. An identifiable chromosome was measured to determine the relative volumes of the chromosomes in these various tissues. The volume of the chromosomes was $4.2 \times$ greater in some tissues than in others. Chromosome volume seems to be one factor controlling nuclear volume. Observations of $2n$ nuclei of various sizes and $4n$ nuclei of various sizes in the ovary wall of *Epidendrum ciliare* showed a similar relationship between nuclear volume and chromo-

some volume. Tetraploid cells were found in the water storage tissue of the leaf in *Rhoeo*, and the ovary wall of *Epidendrum*. Among the factors which may affect the volume of a nucleus are the chromosome number, the chromosome volume and the amt. of nuclear sap present.—E. R. Sansome.

15749. HUSKINS, C. L. The coiling of chromonemata. *Cold Spring Harbor Symposia on Quantitative Biology* 9: 13-17, 1 pl. 1941.—A review of the coiling of the chromonema based largely on studies of meiosis and the pollen-grain division of *Trillium*. The major coil formed at 1st metaphase develops during diakinesis accompanied by a 3-fold increase in chromonema length. The coil is maintained during 2d division and unravels during prophase of the 1st pollen-grain division. During this unravelling the chromosome length decreases. As the relic coil unravels and straightens out the 2 chromatids are intertwined. The number of twists decreases, until metaphase. The relational coiling apparently results from the relic coils being straightened out without unwinding. During prophase of the 1st pollen-grain division a new helix is developed by expansion of a small-gyred coil. The relic of this coil may be seen at prophase of the pollen-tube division. Changes in direction of the major coil are random across the attachment and chiasmata. There are also other fortuitous changes distributed with a frequency related to chromosome length.—G. B. Wilson.

15750. LÖVE, ÁSKELL. Études cytogénétiques des *Rumex*. II. Polyploidie, géographique-systématique du *Rumex* subgenus *Acetosella*. Communication préliminaire. *Bot. Notiser* 1941(2): 155-172, 4 maps. 1941.—Studies on the taxonomy and cytogenetics of *Rumex* subg. *Acetosella* from different parts of Europe have shown that the basic number of this dioecious subgenus of *Rumex* is $x=7$. 4 spp. occur, i.e., *R. angiocarpus* ($2n=14$), a diploid sp. distributed in southern and s.-w. Europe, Africa, America and the islands of the South Atlantic; *R. tenuifolius* ($2n=28$), a tetraploid form from northern Europe and Asia, Iceland and Greenland; *R. acetosella* s. str. ($2n=42$), with almost the same distribution as the tetraploid species; and *R. graminifolius* ($2n=56$), an octoploid arctic-circumpolar sp. The types differ in some qualitative and quantitative characteristics, and their ecological responses are somewhat different. They are all dioecious and belong to the *Melandrium* type of sex-determination. The diploid species possesses an $XX-Xy$ mechanism (the ♂ heterogametic), the tetraploid species an $XXXX-XXYY$ one, and the sex chromosomes of the hexaploid and octoploid species are $XXXXXX-XXXXXY$ and $XXXXXXX-XXXXXXXY$, respectively. This mechanism is fundamentally different from that in *R. acetosa*, in which sex is detd. according to the *Drosophila* scheme. Some problems of polyploidy, speciation and geographical distribution of *Rumex* are discussed.—Áskell Löve.

15751. LÖVE, ÁSKELL. Cytogenetic studies in *Rumex*. III. Some notes on the Scandinavian species of the genus. *Hereditas* 28: 289-296. 1942.—The Scandinavian spp. of *Rumex* belong to the 3 subgenera—*Lapathum*, *Acetosa* and *Acetosella*. This paper deals mainly with the spp. of the 2 first-mentioned groups. Of *Rumex* subg. *Acetosa* only 3 spp. occur in Scandinavia: the hermaphroditic *R. scutatus*, $2n=20$, and the 2 spp. of the section *Euacetosae*—*R. acetosa* and *R. thrysiflora*—both diploid and dioecious with $2n=14$ (♀) and 15 (♂). 3 subspp. of *R. acetosa* occur in Scandinavia—*ssp. pratensis*, *lapponicus* and *fontano-paludosus*. Some karyotypes with different geographical distribution are found in the material of *R. acetosa* studied. The sex ratio is about 100 ♀:40 ♂. A triploid intersex with $2n=22$ chromosomes was found in the material from Iceland. According to Roth (1906: *Ver. preuss. Rheinl.*, Westf., Bonn, 63) agamospermy may be found in the dioecious spp. of *Rumex* subgen. *Acetosa*; the results obtained by the present writer substantiate Roth's theory, as seeds were obtained from about 40% of plants safely isolated; but agamospermy occurs in only 1-2% of the ovules. The chromosome numbers of the spp. of the subgen. *Lapathum* studied were: *R. conglomeratus*, $2n=20$; *R. sanguineus*, $2n=20$; *R. maritimus*, $2n=40$; *R. palustris*, $2n=40$; *R. obtusifolius*, $2n=40$; *R. domesticus*, $2n=60$; *R. cripus*, $2n=60$; *R. hydrolapathum*,

R. aquaticus, and *R. maximus*, $2n =$ ca. 200. *R. maximus* is regarded as a constant allopolyploid hybrid between the 2 other 20-ploid spp.—*Aszell Löve*.

15752. LÖVE, ÅSKELL, and DORIS LÖVE. Chromosome numbers of Scandinavian plant species. *Bot. Notiser* 1942 (1): 19-59. 1942.—This is a list of all the chromosome numbers known within the species of flowering plants found in Denmark, Finland, Norway and Sweden. Except the large apomictic genera *Taraxacum* and *Hieracium*, 1756 spp. are found within this area, and the chromosome numbers have been determined in 1411 spp., i.e., in about 80% of the flora. In Denmark 87.7% of the flora is cytologically determined, in Finland 80.7%, in Norway 83.6% and in Sweden 81.5%. The % of polyploidy in the different countries is as follows: Denmark 51.9% (Monocotyledoneae 70.1%, Dicotyledoneae 45.8%), Finland 54.4 (77.4% and 45.4%, respectively), Norway 53.9% (74.3% and 45.9%, respectively) and Sweden 53.5% (74.6% and 45.9%, respectively). In a table a list of the % of polyploids in different areas from Timbuktu to Spitsbergen is given. Observations not previously published which are given in this table are the % of polyploidy on the Faeroes: 60.7% (76.1% polyploid Monocotyledons and 51.7% polyploid Dicotyledons) and Iceland: 63.5% (84.3% and 53.4%, respectively). In the introduction some fundamental problems of cyt-taxonomy are briefly discussed. The species concept is discussed mainly in connection with the occurrence of more than one polyploid chromosome number within the collective species. "Intraspecific" polyploidy is known in only about 7% of the Scandinavian spp. The authors' viewpoint agrees with the principles given by Nannfeldt (Svensk Botanisk Tidskrift Vol. 32, 1938): "As soon as chromosomal races ('polypotypes') are morphologically distinct and thus recognizable to the taxonomist, they had better be regarded as species even if the morphological characters are small." When the polyploid form is not distinguishable from its diploid relative, they may both be regarded as "cryptospecies" within a collective species. A short discussion of the isolation mechanisms known between different spp. is given. They may be divided into 2 main groups: the biological and the territorial-geographical. Biol. isolation may be of two kinds, i.e., numerical-chromosomal isolation, when the barriers of sterility or incompatibility are due to differences in chromosome number; and structural-chromosomal and genic isolation, when the different spp. have the same chromosome numbers but are separated by a sterility barrier resulting from differences in the chromosome structure and the genic constitution of the different forms. Concerning barriers of the latter kind there is no sharp limit between species differences and intraspecific differences.—*Aszell Löve*.

15753. MATHER, K. Competition for chiasmata in diploid and trisomic maize. *Zeitschr. Zellforsch. u. Mikrosk. Anat. Abt. B: Chromosoma: Zeitschr. Zellkern- u. Chromosomenforsch.* 1(1): 119-129. 5 fig. 1939.—In the largest family, the mean chiasmata per nucleus in the five diploids was 21.28 and in the five trisomics 23.27. The data were subjected to an analysis of variance. In every case, the within nuclei mean square was greater than the between nuclei mean square. Thus there is a greater variance in the number of chiasmata per bivalent than in the number of chiasmata per nucleus. In 3 of the 20 plants, the difference between the mean squares reached the 1% level of significance and in 3 others, the 5% point. In the largest family there was some evidence that the increased chiasma frequency associated with the presence of extra chromosome material was accompanied by a reduction in the degree of negative correlation. There may be an effective upper limit to the number of chiasmata which may be formed in any nucleus, and this limit may be raised by the addition of an extra chromosome. This is discussed in relation to the chiasma frequencies in polyploid series.—*E. R. Sansome*.

15754. NEBEL, B. R. Structure of *Tradescantia* and *Trillium* chromosomes with particular emphasis in number of chromonemata. *Cold Spring Harbor Symposia on Quantitative Biology* 9: 7-12. 2 pl., 5 fig. 1941.—The present study revolves around the interpretation of fixed meiotic and mitotic chromosomes in *Tradescantia* and *Trillium*. The possibility exists that in mitosis as in meiosis anaphase

chromosomes in side view may exhibit a coil upon a coil. This does not rule out the fact that telophase chromosomes of mitosis are considered potentially and sometimes visibly 4-partite after appropriate treatment and preparation. With reference to refraction patterns obtained of anaphase chromosomes in side view, it will be, with the present methods, difficult to decide whether these are the result of a 2-stranded coil containing a secondary minor coil of mitosis overlying the standard mitotic coil in a ratio of 1:6 or 8, or whether 4 chromonemata are present running in independent paths containing only one contracted standard coil. If there are 2 strands with a double coil in mitotic anaphase these may be plectonemic or paranemic; if there are 4 strands they are believed to be paranemic.—*B. R. Nebel*.

15755. SAX, K. Types and frequencies of chromosomal aberrations induced by x-rays. *Cold Spring Harbor Symposia on Quantitative Biology* 9: 93-101. 12 fig. 1941.—The frequency of x-ray induced breaks in only 1 of the 2 sister chromatids increases, while breaks involving both sister chromatids decrease in frequency, as the prophase stage develops and the sister chromatids become more widely separated. One "hit" may break either one or both of the sister chromatids at a given locus. The production of ring and dicentric chromosomes in the resting stage of *Tradescantia* microspores increases as the square of the dosage at high intensities, but the dosage curve approaches linearity at very low intensities. The lower frequency of these 2-hit aberrations at low x-ray intensity is attributed to the time-intensity factor. This interpretation is supported by the results of fractional dosage.—*Karl Sax*.

15757. STEWART, ROBERT N., and RONALD BAMPFORD. (*U. Maryland, College Park*) The chromosomes and nucleoli of *Medeola virginiana*. *Amer. Jour. Bot.* 29(4): 301-303. 13 fig. 1942.—*M. virginiana* has seven pairs of large chromosomes which are easily distinguished by their arm length ratios, total length, and a secondary constriction. 4 of the chromosomes are similar to those in *Trillium* and *Paris*, both closely related genera. A 5th chromosome is similar to one in *Paris* and a 6th is like one in *Trillium*. The 7th is only present in *Medeola*. One chromosome (G) has a secondary constriction on the short arm and in certain stages of both mitosis and meiosis a nucleolus is always present. In the mid-prophase of meiosis the connection of this nucleolus to a nucleolar-organizing body, not the adjacent constriction, was observed.—*Ronald Bamford*.

15758. SWANSON, C. P. (*Michigan State Coll.*) Meiotic coiling in *Tradescantia*. *Bot. Gaz.* 103(3): 457-474. 14 fig. 1942.—By means of heat treatment it was shown that the progress of major coiling in *Tradescantia* is from numerous small coils to a few large ones by a process of despiralization. The coiling cycle is therefore separable into spiraling and despiralization phases. 3 changes take place during despiralization: 1) a change in chromosome length, 2) a reduction in the number of major coils, and 3) an increase in gyre diameter. The minor coils follow the same course except that they appear to be formed after the major coils. When the number of major coils per chromosome is plotted against temp., a unimodal curve results, with a peak at 27°C. At 40°, a breakdown in the chromosome-spindle coordination occurs, and the degree of despiralization is highly variable.—*C. P. Swanson*.

ANIMAL

15759. ASANA, J. J., and T. S. MAHABALE. (*Gujarat College, Ahmedabad, India*) Spermatogonial chromosomes of two Indian lizards, *Hemidactylus flaviviridis* Rüppell and *Macropygia macularia* Blyth. *Current Sci.* 10(11): 494-495. 2 fig. 1941.—In *H. flaviviridis* there are 46 chromosomes, 23 or 24 of which are rod-shaped macrochromosomes, and the remainder dot-like microchromosomes in a central position. In *M. macularia* there are 26 chromosomes, 10 of which are V-shaped and occupy a peripheral position, 6 batonnets lying within the peripheral ring, and 10 dot-like microchromosomes in a central position.—*R. A. Muttkowski*.

15760. AYERS, JOHN. (*U. South Carolina*) The Golgi material in the hypophyseal cells of the immature albino rat. *Anat. Rec.* 81(4): 433-440. 1 pl. 1941.—The chromophobes of the immature rat have their Golgi material either as a cap-like net on one end of the nucleus or separate from

the nucleus. The terms "acidophile-like" and "basophile-like" are fully as applicable to the immature rat as to the adult. Many of the acidophiles and basophiles have their Golgi in the typical locations but frequently this material has unexpected locations. Golgi location alone is not reliable as a means of determining cell type in the immature rat. Vesicles are found free in the cytoplasm of the cells and those farthest from the Golgi are usually larger than those attached to, or near, the Golgi. Two instances of vesicles in blood vessels have been found. It is common to find large vesicles separated from capillaries by only the endothelium and a cell membrane. The vesicles of Golgi material are suggested for consideration as a means of secretion by the hypophyseal cells.—Auth. (courtesy *Wistar Bibl. Serv.*).

15761. BAUER, HANS. Röntgenauslösung von Chromosomenmutationen bei *Drosophila melanogaster*. *Zeitschr. Zellforsch. u. Mikrosk. Anat. Abt. B: Chromosoma: Zeitschr. Zellkern- u. Chromosomenforsch.* 1(3): 343-390. 1939.—The salivary glands of 3404 ♀ larvae from the offspring of X-rayed ♂♂ have been investigated cytologically. The observed chromosomal rearrangements are classified according to: dosage of treatment of the P ♂, type of rearrangement, location of the breaks; a rearrangement includes one or more "contacts," a "contact" involves one or more chromosome breaks, the breaks may be distributed within one or more chromosome areas. (A "contact" is a group of breaks all of which are involved in a single regrouping process.)—The frequency of "contacts" and chromosome breaks are both approx. proportional to the square of the X-ray dosage; the av. number of breaks per "contact," however, increases slightly with increasing dosage. This is taken as evidence that single breaks are the primary process induced by X-rays and that they are due to single "hits." The distribution of breaks along chromosome arms is fairly constant per unit mitotic length, except for a maximum of concentration at the distal ends where breaks are nearly twice as frequent as at the proximal ends. The distances from the spindle-fiber attachment of all breaks belonging to the same contact do not show any correlation, indicating random distribution of chromosomal material in the sperm heads. The relative frequency of inversions and translocations is higher than expected according to random relations, indicating that spacial relationships frequently prevent the regrouping of breaks occurring in different chromosome arms. The same limitations, however, do not seem to affect "contacts" involving several breaks. Limitations to the free recombination of breaks appear again in 4-break rearrangements which fall preferably apart into two independent, 2-break "contacts." Discussion shows that the break recombination is by no means as restricted as to agree with Serebrovsky's "contact hypothesis," although it does not occur completely at random. The information available on the process of recombination appears to be somewhat inconsistent.—U. Fano.

15762. CALLAN, H. G. (John Innes Hort. Inst., Merton.) Heterochromatin in Triton. *Proc. Roy. Soc. Ser. B: Biol. Sci.* 130(860): 324-335. 6 fig. 1942.—When subjected to low temp., certain segments of the chromosomes of *Triton vulgaris*, *T. palmatus* and *T. cristatus* are heterochromatic. At mitosis these segments are undercharged and at meiosis uncharged with nucleic acid. These segments show the same type of allocyclic behaviour as do similar segments in *Paris*, *Trillium* and *Fritillaria*. They form Feulgen-positive chromocentres in all diffuse nuclei except pachytene, which is diffuse in *Triton*. The availability of nuclei acid at the stage when the chromosomes normally spiralize is now shown to be a condition of that spiralization. The diffuse pachytene without chromocentres is followed by meiosis with unspiralized heterochromatin: the diffuse resting nucleus with chromocentres is followed by mitosis with spiralized heterochromatin. With certain exceptions heterochromatin seems to be confined to those parts of chromosomes where chiasmata and crossing-over rarely occur.—Auth. abst.

15763. COOPER, K. W. The nuclear cytology of the grass mite, *Pediculopsis graminum* (Reut.), with special reference to karyomerokinesis. *Zeitschr. Zellforsch. u. Mikrosk. Anat. Abt. B: Chromosoma: Zeitschr. Zellkern- u. Chromosomenforsch.* 1(1): 51-103. 115 fig. 1939.—Oogenesis

is normal, with the exception in both maturation divisions of the presence of Feulgen-negative bodies between the separating chromosomes, corresponding to the chromosomes in position and number, and degenerating at the equatorial plate. In cleavages earlier than the 10th cleavage division, the chromosomes are gonomeric, each possessing an individual karyomere, within which the chromosome condenses and elongates. The chromosomes first show a split at late metaphase; a Feulgen-negative body appears between the separating chromosomes as in meiosis. Cleavages later than the 10th, as well as oögonial mitoses, are normal. Reuter's description was apparently based upon faulty fixation and misinterpretation of mitotic figures.—K. S. Brehme.

15764. EBERHARDT, K. Über den Mechanismus strahleninduzierter Chromosomenmutationen bei *Drosophila melanogaster*. *Zeitschr. Zellforsch. u. Mikrosk. Anat. Abt. B: Chromosoma: Zeitschr. Zellkern- u. Chromosomenforsch.* 1(3): 317-335. 1939.—The cubitus interruptus position effect in *Drosophila* is caused by chromosomal rearrangements involving one break in the small 4-chromosome. The frequency of X-ray induced changes of cubitus interruptus is taken as an index of the total frequency of breaks induced within a certain region of the 4-chromosome and is found to be approx. proportional to the X-ray dosage. This result is evidence that each chromosome break is produced by a single "hit." Furthermore, equal dosages of X-rays of different wave-length yield the same number of cubitus interruptus changes, indicating that the "hit" consists of a single ionization. Expts. in which 6000 r X-rays are delivered within different times yield different frequencies of ci changes; e.g., for the times of irradiation 23, 585, 1290 minutes, the corresponding frequency is respectively 0.594%, 1.436%, 1.174%; the differences appear to be statistically significant. This result is discussed and attributed to phenomena affecting the process of recombination of X-ray induced breaks.—U. Fano.

15764A. PAINTER, T. S., and E. REINDORP. Endomitosis in the nurse cells of the ovary of *Drosophila melanogaster*. *Zeitschr. Zellforsch. u. Mikrosk. Anat. Abt. B: Chromosoma: Zeitschr. Zellkern- u. Chromosomenforsch.* 1(3): 276-283. 18 fig. 1939.—Measurements of oögonial nuclei show an av. diam. of 5 μ , those of the largest nurse cells a diam. of 40 μ , indicating that the latter are 512-ploid, having undergone 8 division cycles. Cytological study of a series of nuclei of comparable size shows a sequence of chromosomal changes resembling those of normal mitosis from a diffuse resting stage to late prophase. No metaphase plate is formed and there is no anaphase movement; the nuclear membrane does not break down. Evidence that the chromosomes have divided is afforded by the presence of larger and more complex clumps of chromosome elements in the larger nuclei. The chromatids tend to collect in 6 or more masses in the stages resembling early and late prophase; in small nuclei this association is extremely close, in later division cycles the chromatids lie more loosely. 5 endomitotic cycles have been observed, although 8 is the theoretical expectation.—K. S. Brehme.

15765. PAYNE, FERNANDUS. (Indiana U.) The cytology of the anterior pituitary of the fowl. *Biol. Bull.* 82(1): 79-111. 1942.—The study has been limited for the most part to the White Leghorn var. At hatching the acidophiles and chromophobes predominate. Functional basophiles are present in both ♂♂ and ♀♀ at 10 days of age and increase in number gradually. They do not appear in Rhode Island Reds until 25 days. In mature birds the basophiles are most numerous. They recede in brooding hens. In old age many basophiles degenerate. The mitochondria hypertrophy and become vesicular. A large spherical body is found in most acidophiles in old birds. Pigment granules are found in both kinds of cells. Acini become numerous. There is a close correlation between these pituitary changes in old age and sex-cell production. Pituitaries of R. I. Reds show these changes earlier than White Leghorns. In castrates basophiles increase in size and number; acidophiles regress. Limited diet retards basophilic development while the acidophiles are but slightly affected. Estrone injections likewise retard basophilic development and affect but little the acidophiles. Estrone injected into limited diet chicks causes greater basophilic changes than either factor acting

alone. Small doses of estrone do not cause pituitary enlargement. Androgen injns. affect basophilic development but the effects are less marked than those following estrone injns. Injns. of estrogens and androgens retard castrate changes.—*Fernandus Payne*.

15765. PFEIFFER, HANS H. Mikrurgische Versuche in polarisiertem Lichte zur Analyse des Feinbaues der Riesenchromosomen von *Chironomus*. *Zeitschr. Zellforsch. u. Mikrosk. Anat. Abt. B: Chromosoma*: *Zeitschr. Zellkern- u. Chromosomenforsch.* 1(4): 526-536. 1940.—Giant chromosomes of *Chironomus* have been examined by polarization microscope under variable stress. When stress is released the chromosomes shrink back to approximately their original size while the achromatic bands remain appreciably elongated. These findings, together with previous results by other authors, are built into a tentative model of chromosome structure.—*U. Fano*.

15767. RATHNAVATHY, (Miss) C. K. (U. Madras.) The spermatogenesis of *Clibanarius olivaceous*, Henderson. *Proc. Indian Acad. Sci. Sect. B*: 13(6): 379-421. 65 fig. 1941.—2n is 116. The 1st spermatocyte division is reductional. Division of the primary spermatocyte gives the secondary spermatocyte whose division is equational, producing 58 chromosomes. The mitochondrial granules finally fuse to form a mitochondrial vesicle. The golgi bodies fuse to an acroblast, which eventually expands to a ring-like structure surrounding the vesicular nucleus. Further changes (descri. in detail) yield the mature spermatozoon.—*W. C. Tobie*.

15768. REITBERGER, A. Die Cytologie des Pädo-genetischen Entwicklungszyklus der Gallmücke *Oligarcus paradoxus* Mein. *Zeitschr. Zellforsch. u. Mikrosk. Anat. Abt. B: Chromosoma*: *Zeitschr. Zellkern- u. Chromosomenforsch.* 1(4): 391-473. 1940.—The equatorial plates of the single equational maturation division (in which no tetrads are formed), as well as of the 1st, 2d and 3d cleavage divisions, consist of 66 chromosomes. In the 3d cleavage division a chromosome elimination occurs in the 3 anterior derivatives of the primary cleavage nucleus. 11 chromosomes are arranged normally on a spindle, and their chromatids migrate to opposite poles and form daughter nuclei, while the remaining 55 chromatid pairs stay on the equator and are later resorbed in the cytoplasm. The 4th (posterior) nucleus divides normally: its anterior daughter nucleus undergoes the same chromosome elimination in the 4th cleavage division, while the post. nucleus and all its derivatives, constituting the germ track, divide normally and therefore have 66 chromosomes. Through a 2d chromosome elimination of the same nature, yet another chromosome is lost from the 11 chromosome nuclei, and all analysable cases show that this chromosome always has the same structure. The 2d elimination takes place between the 6th and 8th cleavage divisions; the resulting 10-chromosome nuclei are diploid with 5 distinguishable chromosome pairs, which are the same in all individuals. In 4th-10th divisions a number of somatic nuclei (up to 100) begin to degenerate in stages between prophase and telophase, forming chromatin masses which are resorbed. After the 11th cleavage division the somatic nuclei no longer divide synchronously. Oogonial and somatic nuclei have a different rhythm of division. In certain oogonial

nuclei there is a peripheral layer of 55 chromosomes, and a more or less central group of 11, which behave differently from the 55. Probably the 66-chromosome nuclei are hexaploid with respect to the 11-chromosome nuclei. It is not excluded that a chromosome exchange occurs in the sex cells between the 55- and 11-chromosome groups. In most eggs the polar nucleus degenerates, but it may also divide. As long as its derivatives survive, they behave like the somatic nuclei, undergoing the 1st and 2d eliminations and becoming incorporated in the embryonic structure.—*E. Sutton*.

15769. SEILER, J., und K. SCHAEFFER. Der Chromosomenzyklus einer diploidparthenogenetischen *Solenobia triquetrella*. Die automiktischen Vorgaenge zu Beginn der Furchung. *Rev. Suisse Zool.* 48(16): 537-540. 1941.—2n of the tetraploid-parthenogenetic individuals is 124. 2 maturation divisions produce eggs with 62 chromosomes. By nuclear fusion during early cleavage the number is restored to 124. This form may have been derived from a diploid-parthenogenetic form in which occasional triploid and tetraploid nuclei are found.—*D. S. Farmer*.

15770. SLACK, H. D. Structural hybridity in *Cimex L.* *Zeitschr. Zellforsch. u. Mikrosk. Anat. Abt. B: Chromosoma*: *Zeitschr. Zellkern- u. Chromosomenforsch.* 1(1): 104-118. 37 fig. 1939.—A comparison was made of the number and behavior of chromosomes in *C. rotundatus* and *C. lectularius*. *C. rotundatus* possesses 14 pairs of autosomes and 3 sex chromosomes (XXY) which are constant in number and regular in their segregation at 2d anaphase. *C. lectularius* has 13 pairs of autosomes, a Y chromosome and from 4-16 univalent elements which behave like sex chromosomes. The number of univalent varies both in different individuals and in different nuclei of the same individual, but the presence of at least 2 appears to be essential. Their segregation at 2d anaphase is irregular but not completely random. The progressive increase in number of these chromosomes by combination is limited by the loss of some univalents at 1st anaphase. The distinct size and frequent secondary pairing of 2 univalents with the Y indicate that 2 X chromosomes, essential for determination of sex, are present in all nuclei as in *C. rotundatus*. The other univalents, while behaving like X chromosomes, are thought to be genetically inert and allied to the X chromosome.—*Jean Lane*.

15771. TIMOFEEFF-RESSOVSKY, N. W. Zur Frage der Beziehungen zwischen strahlenausgelösten Punkt- und Chromosomenmutationen bei *Drosophila*. *Zeitschr. Zellforsch. u. Mikrosk. Anat. Abt. B: Chromosoma*: *Zeitschr. Zellkern- u. Chromosomenforsch.* 1(3): 310-316. 1939.—The frequency of X-ray induced sex-linked lethals is proportional to the dosage of irradiation. The proportionality is not appreciably perturbed although the lethals are partly due to chromosomal rearrangements whose frequency is approx. proportional to the square of the dosage. The smallness of this perturbation is due to 2 causes, according to the author: the frequency of chromosomal rearrangements affecting the X-chromosome is small (2.14% at 3000 r, 7.35% at 6000 r); and not all of these rearrangements act as lethals.—*U. Fano*.

GENETICS

Editors: ORLAND E. WHITE, *Plant*; SEWALL WRIGHT, *Animal*

(See also Entries 15734, 15747, 15750, 15751, 15756, 15770, 15808, 15888, 16069, 16180, 16307, 16312, 16470, 16472, 16473, 16478, 16482, 16495, 16500, 16521, 16525, 16528, 16529, 16540, 16545, 16587, 16666, 16776, 16848, 16853, 16961, 17064, 17086, 17090, 17095, 17098, 17279)

GENERAL

15772. MARSHAK, ALFRED. (U. California.) Relative effects of x-rays and neutrons on chromosomes in different parts of the "resting stage." *Proc. Nation. Acad. Sci. U. S. A.* 28(2): 29-35. 2 fig. 1942.—1. The per cent normal anaphase chromosomes is a negative exponential function of the dose of neutrons or x-rays in different parts of the nuclear cycle. Chromosome abnormalities are, if allowance is made for multiple hits, therefore directly proportional

to the dose at all stages studied. 2. The ratio of neutron to x-ray efficiency (n/x) is constant for different species at the onset of the prophase, but increases by a factor of at least 2 during the nuclear resting stage of single species. 3. Increase in n/x during the resting stage indicates: Conditions for chromosomes response are not constant during resting stage. The intrachromosomal structure responding to ionization may be different for the different parts of the nuclear cycle and resting stage; a theory invoking a single

mechanism for the production of chromosome abnormalities is not adequate. The relative effect of neutrons on chromosomes in the resting nucleus is greater than with x-rays. Neutron therapy may produce regression in tumors which do not respond to x-rays. The daily "safe dose" for exposure to neutrons may be considerably less than x-rays. 4. The use of neutrons and x-rays as described furnishes a method for identifying the functional stages which cannot otherwise be identified.—Auth. abst.

PLANT

15773. ATWOOD, SANFORD S. (U. S. Reg'l. Pasture Res. Lab., State College, Pa.) Genetics of self-compatibility in *Trifolium repens*. *Jour. Amer. Soc. Agron.* 34(4): 353-364. 1942.—The original ♂ parent was selected because it was the only plant out of 615 that averaged over 100 seeds per head when self-pollinated under bag in the field in 1938. Except for descendants from this plant, few others have since shown a similar self-compatibility; this high seed set has been duplicated on clones from the original plant by (a) different technics of selfing in the greenhouse, (b) bagging in the field both with and without manipulation, and (c) bee pollination under a cage in the field. In contrast, the ♀ parent showed low pseudo-self-compatibility. When 14 selected F_1 plants were diallelically intercrossed and backcrossed to both parents in the greenhouse, 2 intra-sterile, inter-fertile groups of 5 and 6 plants, respectively, were found, and these 11 plants were reciprocally compatible with both parents. Different degrees of pseudo-self-compatibility were found among these 11 plants. The other 3 F_1 plants were cross-compatible with both of these groups, with both parents, and with each other. These 3 plants were also self-compatible like their ♂ parent under all conditions tested. These results are explained by postulating that the ♂ parent was heterozygous for a self-compatibility factor (S_f), which is a member of the multiple-allelic series conditioning self- and cross-incompatibility, and that this factor was transmitted to the self-compatible F_1 plants. This theory was confirmed and the different self-compatible genotypes in the F_1 were identified by backcrossing to the parental and F_1 groups, 48 F_2 plants resulting from 4 F_1 intercrosses. The segregations into self-compatible and self-incompatible individuals were clear in most cases, although the effect of modifying factors was more evident with some methods of testing than with others. Certain self-compatible individuals were found to be self-pollinating, i.e., autogamous. Different degrees of self-compatibility were found among 110 1st-generation inbreds from the original ♂ parent, but representative plants even from the lower end of the range were shown to bear S_f . Some of these plants were effectively ♂ sterile because of hard anthers. By appropriate tests with plants homozygous for the incompatibility alleles, it was shown that S_f was dominant over the second allele carried with it in a heterozygous plant. Its presence in pollen, however, did not stimulate other pollen applied with it when the latter was inhibited by the same factor in the pistil.—S. S. Atwood.

15774. BORDONÓS, M. G. (Single-seed forms of sugar beet.) *Doklady Vsesoiuznoi Akademii S.-KH. Nauk (Proc. Lenin Acad. Agric. Sci. U.S.S.R.)* 1941(11): 3-4. 1941.—Natural single-seed hybrids were discovered during extensive surveys in 1934. While all F_1 seedlings, regardless of the method of pollination, reverted to the multiple-seed type, 20-30% of the F_2 produced single seeds. Among the latter further selection was necessary to eliminate the tendency toward late flowering. Yields and sugar-content of F_3 hybrids were normal. The majority of single-seed plants are larger than the normal. Their seeds weigh 3.7-3.8 mg. as against 1.8-2.7 mg. in the multiple-seed plants. Out of 1215 F_2 plants 100 were sterile, 39 would not produce flowers, except in the greenhouse, 167 developed one flower per plant, and 47 developed 3 or more flowers.—V. P. Sokoloff.

15775. GREBINSKAI, M. I. (The anatomy of amphidiploid *Raphanobrassica* and of its parents.) *Botanicheskii Zhurnal SSSR (Jour. Bot. USSR)* 23(2): 106-121. 1938.—A vigorous biennial amphidiploid derived by Karpechenko from Erfurt black radish (♀) and Copenhagen white cabbage (♂) in 1925 resembles the latter in its stem, root and fruit. Leaves, suberized cells of the hypocotyl, and starch granules are intermediate morphologically between the parents.

Doubling of the chromosomes had enlarged the cells of the fruit, the seed covering, and the epidermis of the leaves. The chlorophyll granules, however, became smaller than in either parent and the size of the starch granules and of the cells of the bark was not affected.—V. P. Sokoloff.

15776. HARLAND, S. C., and OLGA M. ATTECK. (Inst. Cotton Genetics, Lima, Peru.) The genetics of cotton. XVIII. Transference of genes from diploid North American wild cottons (*Gossypium thurberi* Tod., *G. armourianum* Kearney, and *G. aridum* comb. nov. Skovs) to tetraploid New World cottons (*G. barbadense* L. and *G. hirsutum* L.). *Jour. Genetics* 42(1/2): 1-19. 2 pl. 1941.—Genes from the North American diploid species ($n=13$) *G. thurberi*, *G. armourianum* and *G. aridum* were transferred by repeated backcrossing to *G. barbadense* and *G. hirsutum*, amphidiploid New World cultivated cottons ($n=26$). All 3 diploid spp. were found to carry normal alleles of the crinkled mutant (*cr*) of *barbadense*, that of *G. thurberi* being weak in dominance, that of *G. armourianum* strong, that of *G. aridum* intermediate. The *armourianum* gene for petal spot (S^{ARM}) acted similarly in *hirsutum* to its action in *armourianum*. In *barbadense* the spot was increased in size and intensity. The gene proved to be an allele of R^H (*hirsutum* red). The *aridum* anthocyanin color complex (S^{ARI}) was reduced in intensity in *hirsutum*, and proved to be also an allele of R^H . In the third and subsequent backcrosses to *hirsutum*, S^{ARI} became mutable, probably as the result of its transference to a new species genome. Two complementary mutant types appeared, (1) loss of spot and stamen filament color but retention of purple flush on petals, and (2) loss of flush on petals but retention of spot and colored filaments. Type (1) occurred both somatically and germinally.—The allelism of S^{ARI} and S^{ARM} with R^H is regarded as conclusive evidence that one genome of the New World cultivated cottons is derived from N. American ancestry; the presence of R^A , allelic to a multiple series found in the Asiatic diploids, indicates that the other genome is Asiatic in origin.—H. B. Glass.

15777. TABLOKOVA, V. A. (A study of heterosis in *Nicotiana* by the anatomical method.) *Botanicheskii Zhurnal SSSR (Jour. Bot. USSR)* 23(3): 209-216. 1938.—Measurements of the dimensions of embryo, endosperm, and of the cells in seeds of 6 vars. and hybrids of *Nicotiana tabacum* and 3 of *N. rustica* show that the greater vigor of the F_1 hybrids, as compared with the parents, is associated with the larger size of the seeds.—V. P. Sokoloff.

15778. JENKINS, J. MITCHELL JR. (South Carolina Truck Exp. Sta., Charleston.) Downy mildew resistance in cucumbers. *Jour. Heredity* 33(2): 35-38. 2 fig. 1941.—Two cucumber vars., China and Puerto Rico No. 37, are highly resistant to downy mildew (*Peronosplasmopara cubensis*) but neither var. is suitable for commercial production. Crosses between resistant and susceptible vars. gave F_1 populations that were intermediate in degree of resistance. In the F_2 , 17 plants out of a population of 588 were as resistant as the resistant parent and 3 plants produced fruits having the dark green color of the commercial parent. Resistant plants were obtained which approach Colorado, one of the best commercial vars., in yielding ability, earliness, and fruit shape.—J. M. Jenkins, Jr.

15779. LEHMANN, ERNST. Zur Genetik der Entwicklung in der Gattung *Epilobium*. III. Die Tübiner hirsutum-Biotypen. *Jahrb. wiss. Bot.* 89(4): 637-686. 39 fig. 1941.—The results of 10 yrs. experimentation with 4 Tübiner *hirsutum*-biotypes are desc. The morphological and physiol. properties of the plants, the results of self crossing and effects of growth hormones in overcoming the retarding phenomenon are discussed. The plants, in general, showed good development.—C. K. Horner.

15780. PETERSON, DONALD F. (U. Idaho.) Duration of receptiveness in corn silks. *Jour. Amer. Soc. Agron.* 34(4): 369-371. 1 fig. 1942.—The duration of receptiveness in corn silks, as studied by seed setting, extended over a period of more than 19 days. One-day-old silks set seed to the extent of 58%; 2- to 8-day-old silks set seed rather uniformly, averaging 91%. Seed setting declined thereafter, reaching 8% on 19-day-old silks.—D. F. Peterson.

15781. SCHERZ, WILHELM. Die Mutationen der Rebe, ihre Bedeutung und Auswertung für die Züchtung. *Wein u. Rebe* 22(4): 73-86. 1940.—The mutations in grape vars.

reported in the literature are reviewed and several new ones are recorded, particularly a tetraploid Riesling. Mutations on berry color, seedlessness, shape and size, chromosome number, and resistance to disease, etc., are recorded. Their possible use in breeding is discussed. The organization of a grape-breeding program in Germany, based on utilization of mutations and of small local variations, is outlined, particularly for disease resistance.—M. A. Amerine.

15782. SCHREINER, ERNST J., and JOHN W. DUFFIELD. (*N. E. Forest Exp. Sta.*) Metaxenia in an oak species cross. *Jour. Heredity* 33(3): 97-98. 1 fig. 1942.—An apparent case of metaxenia similar to that reported by Swingle and others for dates has been observed in an interspecific cross between *Q. alba* (♀) and *Q. robur* (♂) made in the spring of 1941. One effect of the pollen parent is to delay maturity of the hybrid acorns. The reciprocal cross has not been made successfully. The hybrid acorns are somewhat larger than those matured to controlled intra-specific pollination.—L. M. Dickerson.

15783. SILOW, R. A. (*Cotton Res. Sta., Trinidad, B. W. I.*) The comparative genetics of *Gossypium anomalam* and the cultivated Asiatic cottons. *Jour. Genetics* 42(3): 259-358. 1 pl. 1941.—Hybrids of the African species *G. anomalam* with either of the Asiatic cottons *G. arboreum* or *G. herbaceum* set very few seeds when selfed, but by repeated backcrosses genes can be transferred from the former species to the 2 latter, with increasing fertility in successive generations.—Flower color in *G. anomalam* is complementary to the *Y_a* and *Y_b* loci in the Asiatic species. The new locus is designated *Y_c^P*, pale corolla; *arboreum* and *herbaceum* carry *Y_c*. *Y_c^P* is associated with short petals, when in *arboreum*. The low intensity of yellow in the *anomalam* corolla is due to another gene, *Y_d^P*, yellow depressor, which lowers the intensity of full yellow from grade 8 to grade 4. *Y_c^P* with *y_d^P* is grade 3; with *Y_d^P*, grade 2. *Y_d^P* affects petal length slightly. The far greater range of variability in hybrid progenies of *anomalam* with the Asiatic spp. than in *herbaceum* \times *arboreum* progenies is mainly due to *Y_d^P*. No linkage was found for either the *Y_c^P* or *Y_d^P* loci.—Red petal spot in *anomalam* is the effect of complementary interaction between a ghost spot allele (*R_s⁰⁰*) and a spotless allele (*R_s⁶⁰*) in a duplicate locus. The Asiatic spp. carry *r_s⁰⁰*, no anthocyanin, no spot. The *R_s⁶⁰* allele produces a new phenotype, gold petal, when homozygous with *R_s⁴⁰* or *R_s⁰³* in the duplicate locus. The gold characteristic is very variable, depending on the presence of homozygous *Y_a*, yellow, for expression. With *Y_d^P* and *Y_aY_a*, the corolla becomes pink. *Y_b* and *Y_a* heterozygosity does not reduce gold. In pale or white forms, as in *anomalam* itself, gold is scarcely evident. A strong modifier for large spot size is fairly closely linked to the *R_s⁶⁰* gene; aside from this modifier the *anomalam* genotype is at a comparatively low level for spot size modifiers. By recombination, forms can be obtained with the petal spot reduced to extinction. Dominance in spot modifiers is in the direction of larger size. Spot modifiers are not specific in action on spot genes. No linkage for the *R_s* locus was proven.—*G. anomalam* has pale cream pollen, apparently due to a gene identical with the recessive *pa* of *G. herbaceum*; *anomalam* carries the normal allele of the pale pollen gene, *pa*, found in *G. arboreum*.—*G. anomalam* resembles *G. arboreum* in carrying the dominant gene, *Ne*, for leaf nectaries, and resembles *G. herbaceum* in minor bract nectary genotype, except with bract nectaries external instead of internal in position, probably due to *Ne*.—Seeds are fuzzy in *G. anomalam*, due to *fz* as in the Asiatic species, but the level of modifiers of fuzz intensity is far lower than in either of the other species.—Lint color genes in *G. anomalam* include *lci*, white, typical of *arboreum* and prevalent in *herbaceum*, *Lc₂^B*, light brown, infrequent in *arboreum* but typical for *herbaceum*, and perhaps a 3d factor *Lc₂^B*, light brown, only found occasionally in *herbaceum*. The brown modifier level is high, as in *arboreum*.—Crumpled-lethal, due to the interaction of *Cpa* and *Cpb*, appears in hybrids of *G. anomalam* \times *Cpa* strains of *G. arboreum*. *G. anomalam* has the genotype *cpa*; *Cpb*. The modifiers cause death in the cotyledon stage, as in *arboreum*, not producing empty seeds as in *herbaceum*.—The genetic structure of the 3 spp. has been assessed for 15 loci and their modifiers. The same loci are represented in each

species but by different alleles, *G. anomalam* being most divergent. Modifier levels in *G. anomalam* in 5 cases differ widely from either other species, in one case resemble *herbaceum*, in 3 cases, *arboreum*. The presence of duplicate loci strengthens the hypothesis of the polyploid origin of these diploid species. The genetic situation in the three species exemplifies on a higher level the geographic differentiation within the species, some differences appearing to be adaptive, others fortuitous.—H. B. Glass.

ANIMAL (EXCEPT MAN)

15784. BOGART, RALPH, and MERLE E. MUHRER. (*U. Missouri.*) The inheritance of a hemophilia-like condition in swine. *Jour. Heredity* 33(2): 59-64. 4 fig. 1942.—A hemophilia-like diathesis characterized by prolonged bleeding due to a deficiency in available thromboplastin has been observed in one line of inbred swine. The abnormality increases in severity as the animals become older. The data, which include 84 matings and 585 offspring, indicate that the defect is due to a recessive gene and is not sex-linked. The evidence indicates that variations in severity of the character are caused by modifying genes.—M. E. Muhrer.

15785. BRUCKNER, J. H. (*Cornell U., Ithaca*). Inheritance of white plumage in *Phasianus*. *Auk* 58(4): 536-542. 1 pl. 1941.—White plumage in the genus *Phasianus* is due to a single, autosomal, recessive gene, *c*, present in the homozygous condition. This is shown by ratios observed in 103 *F₁*, 262 backcross, and 197 *F₂* pheasants following crosses involving white and Ring-neck Pheasants.—J. H. Bruckner.

15786. BUTARIN, N. S. [Interspecific hybridization between the wild sheep (*Ovis polii karelini* Sev.) and New-Caucasian Merino sheep (*Ovis aries hispanica*).] [With Eng. summ.] *Trudy Instituta Genetiki (Bull. Inst. Genetics)* 13: 175-247. 30 fig. 1940.—Hybrid lambs were produced by New-Caucasian Merino ewes through artificial insemination with sperm from wild Arkhar rams shot in the mountains. They showed a general dominance of the wts., measurements, and temperament of the wild type. The 69 lambs so produced by 58 ewes were like the Arkhar parent, were heavier than Merinos, and grew more rapidly. All progeny from crosses with horned Merinos had horns, but from crosses with hornless Merino sheep all the ♂♂ and 9 ♀♀ were horned and 6 ♀♀ were hornless. The form of the horns was that of the Arkhar. The wool qualities of the *F₁* were inherited mainly from the Merino, although there was not complete dominance, but the structure of the fiber was from the Arkhar. In color there was dominance of the white of the Merinos, but other factors or modifiers produced over 90% *F₁* progeny with red in the wool. The 2n chromosome number of both species was 60.—Courtesy *Exp. Sta. Rec.*

15787. CLARK, ARNOLD M. (*U. Pennsylvania.*) Linkage relations of six factors in *Habrobracon*. *Jour. Heredity* 33(2): 78-80. 1942.—One 6-point and two 4-point crosses were made involving the factors black, lemon, cantaloup, long, honey and veinless. Crossover % in these expts. range from 23 to 27.9 for black and lemon, from 11.3 to 12.5 for lemon and cantaloup, from 13.3 to 15.7 for cantaloup and long, from 9.4 to 9.8 for long and honey and from 7.2 to 7.9 for honey and veinless. Evidence is presented to show that there is no interference by crossing-over in the black-lemon region with any region to the right of lemon. The spindle-fiber attachment may be near lemon. Double cross-overs occurring in the cantaloup-long, honey-veinless region have a lower ratio of coincidence than do the doubles occurring in the long-honey, honey-veinless regions. In this case interference is greater with a distant than with a nearer region.—Auth. summ.

15788. DUNN, L. C., S. GLUECKSOHN-SCHOENHEIMER, M. R. CURTIS, and W. F. DUNNING. (*Columbia U.*) Heredity and accident as factors in the production of taillessness in the rat. *Jour. Heredity* 33(2): 65-67. 1 fig. 1942.—Congenitally tailless rats are found in 3 inbred families in frequencies which are characteristic for the family. In family 1 the frequency was 1.3%; family 2, 1.6%; family 3, 3.7%. Tailless animals had the same genetic constitutions as normals of the same family. It is assumed that the genetic constitution determines the threshold (and

thus the frequency) of developmental reaction which is subject to accidents of a random sort which lead to resorption of the tail during embryogeny.—*L. C. Dunn.*

15789. HUTT, F. B., and C. D. MUELLER. (Cornell U.) Sex-linked albinism in the turkey, *Meleagris gallopavo*. *Jour. Heredity* 33(2): 69-77. 4 fig. 1942.—In a type of imperfect albinism occurring in Bronze turkeys, nearly all melanic pigment is eliminated from the plumage. In the eye, some melanin is found in the retinal portions of the ciliary body and iris, but not in the pigment epithelium of the retina in the posterior part of the eye. Affected pouls are blind. The condition is caused by a sex-linked recessive gene, *al*, which is lethal during embryonic development to about 75% of the ♀♀ carrying it. Most albinotic pouls die within 6 weeks of hatching, partly because of the handicap imposed by their blindness. Differences between sex-linked imperfect albinism in the turkey and in the fowl are pointed out and the economic significance of the defect is discussed.—*Auth. summ.*

15790. JACOBS, J. L., J. J. KELLEY, and S. C. SOMMERS. Hereditary predisposition to sensitization in guinea pigs. *Proc. Soc. Exp. Biol. and Med.* 48(3): 639-641. 1941.—Sensitization to allyl isothiocyanate was accomplished in a small % of unselected guinea pigs. By selective breeding a strain was obtained practically all the members of which could be readily and strongly sensitized with this substance. A strain resistant to sensitization is being further bred out.—*Auth. summ.*

15791. LUS, J. J. [Stripings in domesticated horses.] [With Eng. summ.] *Trudy Instituta Genetiki (Bull. Inst. Genetics)* 13. 297-319. 15 fig. 1940.—Striping in horses occurs in many domestic breeds as a mutation analogous to brindling in cattle and dogs.—*Courtesy Exp. Sta. Rec.*

15792. MacARTHUR, JOHN W. (U. Toronto.) Relations of body size to litter size and to the incidence of fraternal twins. *Jour. Heredity* 33(3): 87-91. 1942.—From the same original population of laboratory house mice, plus selection for body size alone continued 7 generations raised 60-day wts. of ♀♀ to > 27 grams, while minus selection lowered ♀ wts. to < 14 grams. Increase or decrease in body size brought with it a corresponding and proportionate change generation by generation in litter-size, which in generation 7 averaged 9-10 in the large and 5-6 in the small race. The rule holds quite generally in mammals that, within a species, litter-sizes are largest in the larger bodied races of laboratory animals, in the larger breeds of domestic animals, and in the larger geographic races of wild mammals in nature. Similar evidence is assembled supporting the parallel view that the larger races of man also tend to show the highest incidence of fraternal twins and multiple births. The gonadotropic hormone of the anterior pituitary provides a suitable and effective nexus between body size and litter size. The genetic factors regulating size of litter or frequency of fraternal twins are probably largely the same as those controlling general body size, and only in part specific.—*J. W. MacArthur.*

15793. MORGAN, T. H. (California Inst. Tech., Pasadena.) Genesis of the white-eyed mutant. *Jour. Heredity* 33(3): 91-92. 1942.—Some interesting historical details in connection with the early genetic work in which this gene was used are cited. The information is given to correct an inexact quotation in a review of "A Lot of Insects" which appeared in the Jan. 1942 number of *Jour. Heredity*.—*L. M. Dickerson.*

15794. PANFILOVA, E. P. [Analysis of the offspring of a Karakul ram used for insemination of 5,000 ewes.] [With Eng. summ.] *Trudy Instituta Genetiki (Bull. Inst. Genetics)* 13. 321-329. 1940.—The lambs produced by ewes having fleeces of different quality showed that the best-grade Karakul lamb fleeces were produced by the progeny of fine-curl dams.—*Courtesy Exp. Sta. Rec.*

15795. PANFILOVA, E. P. [Inheritance of white spotting in black Karakul sheep.] [With Eng. summ.] *Trudy Instituta Genetiki (Bull. Inst. Genetics)* 13. 331-338. 3 fig. 1940.—There is a correlation between the white spotting on the back of Karakul sheep and white spots on the tail and head, thus permitting breeding of one parent, having white spotting on the tail only, with an all-black animal.—*Courtesy Exp. Sta. Rec.*

15796. PATRUSKEV, V. I. [A contribution to the

genetics of the biochemical characters in animals in relation to their size.] [With Eng. summ.] *Trudy Instituta Genetiki (Bull. Inst. Genetics)* 13. 121-153. 6 fig. 1940.—The glutathione conc. of cattle and sheep differed according to breed, but the individual animals remained relatively constant, gradually decreasing after 3 yrs. of age. The catalase index was higher in calves than in adults, but there was no reduction with age in adult animals. On an average, body wt. was associated with glutathione conc. and catalase activity in the blood.—*Courtesy Exp. Sta. Rec.*

15797. PICTET, A. Recherches sur l'hérédité de la dilution et du blanchiment du pelage dans le genre *Cavia*. *Genetica* 22(1/3): 1-122. 21 fig. 1940.—Part 1 deals with dilution. Dilution of all color among the descendants of 2 animals behaved as a simple recessive (*i*) to the intense color (*I*) of the author's stock. Crosses with stock albinos (interpreted as *iicc*) gave only dilutes, lighter than the dilute parent. This dilution is not the same as that ascribed by others to gene *f* (affecting only yellow) or *p* (affecting only black). The relation to the alleles (*c^k*, *c^d*) of albinism, which dilute all colors, is not discussed. In crosses between the Argentine wild cavy (*Cavia aperea*) which is a dilute agouti and the guinea pig (including both intense and albinos), *F*₁ was always intense. The highly diverse *F*₂ is classified into wholly intense, intense back with dilute belly, dilute back with intense belly and wholly dilute in the ratio 9:3:3:1. Other data support a 2-factor ratio. It is postulated that gene *i* of *C. aperea* has become regionally dissociated in the hybrids. Part 2 deals with various kinds of whitening of the coat. The effects of white spotting in suppressing one or more of the black points of descendants of a supposedly mutant Himalayan albino are discussed at length. The hair of *C. aperea* differs from that of pigmented guinea pigs in being white at the base. In the *F*₁ hybrids, including ones from an albino guinea pig, the hair was always pigmented to the base. Later generations indicated that white base is due to a single recessive, considered to be a localization of the albino gene. *C. aperea* has a more fusiform body and smaller ears than the guinea pig. *F*₁ exhibited the massive body (*M*) of the guinea pig but the small ears (*P*) of *C. aperea*. *F*₂ exhibited segregation in the ratio 9:3:3:1. Color of the hair base (*C, c*) and the pair agouti (*A*)—non-agouti (*a*) segregate independently of each other and of the 2 morphological characters. A variety with stable irregular white areas on the belly arose supposedly by mutation. The results of crosses are attributed to a single dominant gene (*V*) for this character. Slight dorsal silverying with white (present at birth) appeared on one of the white bellied individuals and is attributed to another mutation. The data are taken to indicate an independent recessive *d*. The absence of normals from the cross *VvDd* × *VvDd* is attributed to lethality of *vvD* when produced thus. This was not lethal when produced by *VvDd* × *vvdd* and reciprocal, and other matings. Other exceptions are attributed to mutation. The extent of dorsal silverying greatly increased in the course of 10 generations. Data are given indicating reduced capacity for reproduction, reduced size of litter and increased natal mortality in association with dilution or whitening.—*S. Wright.*

15798. PRICE, JOHN B., and C. H. DANFORTH. (Stanford U.) A persistent mutation in the California quail. *Condor* 43(6): 253-256. 3 fig. 1941.—"Dilute" is a mutation in *Lophortyx californica* which results in a diminution of intensity of color in both sexes and is accompanied by decreased viability. It was observed in young quail hatched in captivity, as well as in a freed brood found on Stanford campus. The appearance of offspring resulting from one cross of normal with normal and from 4 crosses of dilute with normal suggests the probability that the bleached condition is due to a single pair of recessive alleles. The Stanford museum contains dilute specimens collected near Stanford campus in 1896. Dilute adult quail are almost never seen in the field, probably on account of the semi-lethal nature of the mutation, and they apparently do not occur in other localities. The mutant genes have possibly been continuously present in the quail population of this restricted geographical area since at least 1896.—*Eugene Brown.*

15799. SAWIN, P. B., M. V. ANDERS, and R. B. JOHN-

SON. (Brown U., Providence, R. I.) "Ataxia," a hereditary nervous disorder of the rabbit. *Proc. Nation. Acad. Sci. U. S. A.* 28(4): 123-127. 1942.—Ataxia, a degenerative disorder involving the brain stem, appears to have arisen by a mutation, and is transmitted as a simple mendelian unit. By crossing it can be introduced into unrelated and unaffected families to become manifest in subsequent generations. Likewise it can be eliminated by proper breeding tests accompanied by selection of those segregates which are free from the defect, for establishment of a new line.—*Auth. abst.*

15800. SOKOLOVSKAIA, I. I., and V. K. MILOVANOV. [Attempts on induction of epigamic sex reversion in birds.] [With Eng. summ.] *Trudy Instituta Genetiki (Bull. Inst. Genetics)* 13: 339-346. 1940.—The sex ratios of chicks hatching from eggs injected with novo-ovaricin into the air chamber on the 3d to 6th and 7th to 12th days of incubation were 38.8% ♂ and 67.2% ♀, with a mortality of 33.8%. The sex ratio was modified by the greater mortality of the ♂♂. The sexes of chicks from eggs uninjected and eggs injected with folliculin approached equality, and mortality was reduced.—*Courtesy Exp. Sta. Rec.*

HUMAN BIOLOGY

EARL W. COUNT, *Editor*

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15801. AGDUHR, ERIK. Einiges über Methoden und Ergebnisse bei Forschung über resistenzfördernde Wirkungen der Sexualfunktionen. *Jahrb. Morph. U. Mikrosk. Anat. Abt. II. Zeitschr. Mikrosk-Anat. Forsch.* 49: 589-615. 5 fig. 1941.—Starting out from the accidental observation that mice living a normal sexual life are more resistant to high doses of irradiated ergosterol than isolated groups of either ♂♂ or ♀♀, Agduhr tested the influence of sexual life on the resistance to various poisons. Statistical evaluation of the data showed that animals living a sexual life are more resistant to a variety of poisons (vitamin D, As₂O₃, barbital, CuSO₄, and diphtheria toxin) than those kept separated from the opposite sex. Sexual functions seem to have an effect on the wt. and the chemical composition of the endocrine organs and also on the number of mitoses occurring in them.—*G. Gomori.*

15802. BANAY, RALPH S. (Chief Psychiatrist, Sing Sing Prison.) Alcoholism and crime. *Quart. Jour. Stud. Alcohol* 2(4): 686-716. 1942.—To evaluate the significance of alcoholism in crime causation, the total admissions to Sing Sing Prison during 1938-39 and 1939-40—1,576 and 1,559 men respectively—were carefully surveyed and the extent of alcoholism was checked from objective sources; police and court records were searched for previous arrests for intoxication as well as hospital admissions for alcoholic conditions. In physical examinations, alcoholic habitus, neuritis, enlarged liver and pellagra were noted. After careful sifting, all those offenders were eliminated from the intemperate group whose alcoholism: 1) appeared long after persistent commission of crimes; 2) appeared as a sequence to an immoral life or just another symptom of dissolute, restless and unrestrained existence; 3) served only as an agent to give false courage or dispel scruples prior to the commission of a crime. Only by rigid observation of these principles and by avoiding the confusion of previous criminal statistics in this respect was it possible to divide on an objective ground the "alcoholic criminals" from the "criminals who are alcoholic." In the fiscal year 1938-39, out of the total admissions of 1,576, 311 (19.7%) were classified as primarily intemperates, 396 (25.1%) as secondary intemperates and 896 (55.2%) as non-alcoholics. The control group consists of the secondary intemperates and non-alcoholics. In the fiscal year 1939-40, of the total admissions of 1,559, 378 (24.2%) were classified as primarily intemperates, 433 (27.8%) as secondary intemperates and 748 (48%) as non-alcoholics. The total control group thus totals 1,181 or 75%. Not all inmates who are included in

previous alcoholic statistics can be justly classified as alcoholic criminals. Their habits run parallel to criminality rather than being etiological. This explains the high % given to alcoholic offenders by previous investigators, claiming as high as 60%. The significant finding of the present study is that, in 25% only of the total offenders, alcoholism was closely related to the commission of the crime or was directly responsible for it. In alcoholism, evidence of psychopathology is more readily discernible than in the history of the average criminal offender. Poorly integrated personality, emotional instability, paranoid traits, conflicts with the environment and frustrations of multitudinous nature are the more common findings. It is generally known that some drinkers might, in spite of frequent intoxication, go on for the rest of their lives without ever violating more than conventions of civilized conduct while there are others whose even casual drinking might lead to serious consequences. This symptom is described by the present study as "social incontinence." It is an incoordination of personality to such a degree that one passes from mischief to crime. As a person progresses in his alcoholic career, he reaches his individual alcoholic tolerance but still remains within socialized behavior. In this state he is troublesome only to himself, his family and his immediate associations. When he passes his social alcoholic tolerance, he is likely to respond to inner or outer stimulus with an antisocial act.—*R. S. Banay.*

15803. BEASLEY, W. C. Characteristics and distribution of impaired hearing in the population of the United States. *Jour. Acoust. Soc. Amer.* 12: 114-121. 1940.—Data obtained by the U. S. Public Health Service were analyzed. Hearing loss was correlated with social history, clinical history, age, sex, and family income. The annual incidence of new deafness cases and other statistics are reported.—*S. S. Stevens (in Psychol. Abst.).*

15804. BRUCH, H. Obesity in childhood and personality development. *Amer. Jour. Orthopsychiat.* 11: 467-475. 1941.—From a study of obese children the author concludes that obesity in childhood may be understood as a disturbance in the maturation of the total personality and as a somatic compensation for thwarted creative drives, whereby the total size of the body becomes the expressive organ of the conflict. Neither mechanical reduction of food intake nor endocrine therapy is usually indicated. To be successful, therapy should help the child grow independent and self-reliant and make constructive use of his good physical and mental endowment, so that he can find more dynamic

outlets for his creative drives than the static form of physical largeness.—R. E. Perl (*in Psychol. Abst.*).

15805 CIOCCO, ANTONIO. On the interdependence of the length of life of husband and wife. *Human Biol.* 13 (4): 505-525. 1941.—From the death records of 1222 white married couples of whom both spouses died in Washington County, Maryland, between 1898 and 1938, the observed differences between age of death of husband and wife have been compared with differences calculated assuming: (I) Randomly assorted pairs of men and women of given age and age difference at marriage are subject after marriage to the mortality of: (a) the 1222 couples; (b) the U. S. life table population as of 1929-1931; (c) the U. S. life table population as of 1900-1902. (II) Randomly assorted pairs of men and women of whom one has died at the given age, and the widowed who is of given age is subject thereafter to the chances of death for his or her age and sex. The observed differences are significantly lower than the theoretical calculated under any of the hypotheses mentioned. The deviation between theoretical and observed is most marked when the age of death of one spouse and the age of the survivor would lead to the expectation of a large difference between the death of husband and wife. The deviation between theoretical and observed is of the same order for the spouses both of whom died between 1919 and 1938 and for the spouses one or both of whom died between 1898 and 1918. The observed differences decrease with increase in the duration of marriage, but this trend turns out to be spurious and apparently due to the relationship between age of death and duration of marriage. It is concluded that there exists a real association between the length of life of husband and wife, and this association is probably the result of factors that enter into marital selection.—*Auth. summ.*

15806. DARLING, IRA A. (Torrance State Hosp., Torrance, Pa.) Inebriety: A classification. *Quart. Jour. Stud. Alcohol* 2(4): 677-685. 1942.—Inebriety is a word of as vague and undefinable meaning as the word insanity. The understanding and treatment of inebriates require as broad a knowledge of psychiatric medicine as does the treatment of insanity. Inebriety in many cases seems one of the means used by humans to escape the painful realities of life. In this sense it is closely related to suicide, persistent delinquency, psychoneuroses and psychoses. All of these may be used as escapes from, or crutches to help one over, situations which seem otherwise intolerable. If this view is correct, a successful psychiatric treatment offers the main hope of control and the elimination of alcohol from use would be of little value; if alcohol is only one of several socially unacceptable methods of meeting stress the sick people facing such troubles would, if alcohol was unavoidable, turn to one of the other unfortunate mechanisms. Suicide, delinquency, neuroses and psychoses are certainly no more desirable than inebriety. With our present knowledge we must continue to study carefully each individual inebriate, using all our knowledge of medicine and psychiatry, and try to help him to become a healthy man, neglecting no phase of the body and its functions. If we can give him a healthy body, and help him to understand himself as he never has before, he may gain the capacity to face future life stresses without "flight" or "crutches."—*I. A. Darling.*

15807. DENNIS, W. The significance of feral man. *Amer. Jour Psychol.* 54: 425-432. 1941.—The author reviews some of the material respecting children purporting to have lived with animals and summarizes some of the difficulties that must be surmounted before there is scientifically valid evidence that they actually did so live. In particular he cites some of the data respecting their intelligence. "In view of our ignorance concerning the history of alleged isolated children I suggest that these cases not be cited as evidence for any social or psychological theory. We know that there are idiots and imbeciles. We know that alleged feral man has similar characteristics. Until we have better evidence it seems best to reserve judgment as to whether or not 'feral' children were idiotic or imbecilic before they became 'feral.'"—D. E. Johannsen (*in Psychol. Abst.*).

15808. ELLINGER, TAGE U. H. On the breeding of Aryans and other genetic problems of war-time Germany.

Jour. Heredity 33(4): 141-143. 1942.—The author describes some of the activities in research and the application of research in genetics observed while visiting in Nazi Germany. A rather sharp contrast is revealed between the official attitude toward research and research workers and that toward victims of official efforts to breed out of the German people those human characteristics of mind and body which have been labelled non-Aryan.—*L. M. Dickerson.*

15809. FISHER, MARY S. (Vassar Coll.) Helping young America to responsible parenthood. *Jour. Heredity* 33(3): 101-104. 1942.—Discussing the need for a change in the modern social attitude which places material wealth in property and luxury goods above social adjustment and family responsibility as marks of individual success. The author contrasts self-forgetfulness, self-control and self-friendliness with self-centeredness, self-defensiveness and self-distrust as respectively constructive and destructive psychological attitudes which help or hinder the achievement of responsible parenthood. 7 "basic assumptions" about the process of personality development are made. The discussion is entirely subjective although several references are made to objective studies of social problems.—*L. M. Dickerson.*

15810. FOLK, OLIVER HAROLD. [Prepared by.] Analysis of reports of physical examination. Summary of data from 19,923 reports of physical examination. *Selective Serv. System Med. Statistics Bull.* 1: 1-31. 1941.—A preliminary survey of 19,923 reports of physical examination for each registrant under the Selective Service Act is presented, pending complete analysis of reports of the 2,000,000 registrants. About 1,000,000 men were qualified for any type of military service; 470,000 were qualified for slightly limited service and 430,000 were disqualified due to physical or mental defects; an additional 100,000 were disqualified for educational deficiency. It is estimated that 200,000 of the 900,000 not qualified for full military duty due to physical defects can be completely rehabilitated at reasonable cost and in a reasonably short time; perhaps half of these men have remediable dental defects. Tables are presented analyzing this special sample of 19,923 reports according to age distribution, race, urban-rural residence, place of birth, height, weight and chest measurements, acuity of vision and hearing, occupation, and incidence of disqualifying and non-disqualifying physical defects.—*P. M. Zoll.*

15811. GLASS, D. V. Population policies and their objectives. *Jour. Heredity* 33(3): 107-112. 1942.—By historical review the author shows that population policies have been established by ancient as well as modern nations and that democratic as well as authoritarian governments have actively promoted them. Some have been repressive instead of population-boosting programs which have received more prominence. With the exception of Sweden none of the countries have looked at the population problem as a whole. There have been marked similarities in the use of large-scale immigration and such measures as (1) propaganda to encourage marriage and parenthood; (2) repression of the use of individual control of conception and childbearing; and (3) the granting of cash and other allowances. Legislators have refused consistently to recognize that the population trend is part of the economic and social environment and cannot be changed without changing that environment.—*L. M. Dickerson.*

15812. GONÇALVES, P., e L. CAIRE. (Hosp. Central Exerc., Rio de Janeiro.) Estudo comparativo da capacidade de adaptação entre indivíduos de raça branca e raça negra. [Comparative study on the ability of adaptation, to light and dark, of white and colored people.] *Hospital [Rio de Janeiro]* 20(5): 727-731. 1941.—The adaptation of visual purple to light and darkness was studied in 80 white and 90 black individuals. The colored people showed a higher adaptability than the whites. Vitamin A (450,000 I.U.) given by injection increased the capacity of adaptation; liver extracts were without effect.—*M. Rocha e Silva.*

15813. McCLEARY, G. F. Pre-war European population policies. *Milbank Memorial Fund Quart.* 19(2): 105-120. 1941.—Before the war 5 European countries—Belgium, France, Germany, Italy and Sweden—operated policies designed to promote population growth. These included

measures to reduce infant mortality, family allowance systems, special taxation of bachelors, measures to promote rural settlement and prevent urbanization, penalties for illegal abortion and birth-control propaganda, loans to couples wishing to marry, payment of bonuses on confinement and reduced rents to large families. In general these policies did not have the desired effect although birth rates increased in both France and Germany where publicity and consideration of national policies tended to increase birth rates as a duty to the State.—*E. K. Kline.*

15814. MALZBERG, B. Trends in the growth of population in the schools for mental defectives. *Amer. Jour. Ment. Defic.* 45: 119-126. 1940.—No sound statistical evidence is available that there has been an increase in the prevalence of mental deficiency within recent decades. The author presents a statistical study of admissions to institutions for the feeble-minded and finds a steady growth in number of institutions caring for mental defectives and an annual increase in the number of patients under treatment. However, such growth is an index not of an increase in the number of defectives in the community but of the provision of more adequate facilities for their care.—*M. W. Kuenzel (in Psychol. Abst.).*

15815. PANUNZIO, CONSTANTINE. (U. California, Los Angeles.) Population trends in the United States. *Sci. Month.* 54(4): 353-360. 1942.—A comparison of the 1930 and 1940 censuses of the U. S. shows that the population is increasing at a decreasing rate, the growth of cities is slowing down, the poorer classes are multiplying at a more rapid rate than the rest of the people and the old age segment of the population is greatly increasing. Some of the sociological implications of these facts are discussed.—*F. R. Hunter.*

15816. SEWARD, J. P. The hormonal induction of behavior. *Psychol. Rev.* 48: 302-315. 1941.—The tendency of modern psychology to emphasize peripheral rather than central mechanisms, because of their greater ease of objective approach, has led to a theory that, in reproductive activities, the hormones exert their effects on behavior through the genital tract, while the nerve centers merely transmit afferent impulses from these hormone-sensitive tissues. The exptl. evidence indicates, however, that in many mammals the typical reproductive activities can occur without reinforcement from the viscera most concerned. The evidence strongly suggests a direct action of the hormones on the brain stem, but the crucial experiment has yet to be performed.—*A. G. Bills (in Psychol. Abst.).*

15817. STRANDSKOV, HERLUF H. (U. Chicago.) On the variance of human live birth sex ratios. *Human Biol.* 14(1): 85-94. 1942.—The variances (1) of the yearly live birth sex ratios for the Chicago Area from 1919 to 1938 inclusive, (2) of the live birth sex ratios of the 48 states and the District of Columbia for the year 1935, (3) of the monthly live birth sex ratios of the U. S. population as a whole for the year 1935, and (4) of the yearly live birth sex ratios of the U. S. population as a whole, from 1923 to 1937 inclusive, were compared with the respective variances of the live birth sex ratios expected due to random fluctuations. The general conclusion drawn is that the factors which are responsible for the deviation of human live birth sex ratios from the expected 50:50 ratio are not significantly

affected (1) by the usual changes which occur in the external environmental conditions and the genetic composition of a local population over a relatively long period of time, (2) by the external environmental and genetic differences which exist between the different states of the United States, considering an interval of one year, and (3) by the external environmental differences which obtain during the different months of one year in the U. S.—*H. H. Strandskov.*

15818. TANSER, H. A. Intelligence of negroes of mixed blood in Canada. *Jour. Negro Educ.* 10: 650-652. 1941.—A brief review of several studies concerned with the relationship between intelligence and bloodedness of Negroes is followed by a summary of the writer's findings. Without the support of PE's, the writer concludes that the trends toward a positive relationship between amt. of white blood and intelligence on the Natl. Intelligence Tests are due to the latter's dependence upon acquired knowledge and school achievement. The inconsistency of the results on the Pinter Non-Language and Pinter-Patterson Performance tests is taken to indicate no relationship between bloodedness and intelligence.—*W. E. Walton (in Psychol. Abst.).*

15819. VOEGTLIN, WALTER L., and FREDERICK LEMERE. (Shadel Sanitarium.) The treatment of alcohol addiction: A review of the literature. *Quart. Jour. Stud. Alcohol* 2(4): 717-803. 1942.—This paper is a complete review of the literature, both American and foreign, concerning the various treatments of chronic alcoholism. There was only one article besides our own report in the entire literature giving an accurate statement of the results obtained with a specific treatment. Tillotson and Fleming reported 15% cure (complete abstinence) for 18 months following the usual type of psychiatric treatment at the McLean Hospital. We have reported between 50% and 60% complete abstinence for 4 yrs. or longer in a previous paper. These results were obtained by conditioned reflex treatment of alcoholism. Of all the different approaches to chronic alcoholism that of religious conversion or prolonged institutional care seemed to give the best results but are limited to a small group of selected patients. Psychotherapy and psychoanalysis have not given as good results as would be expected. The conditioned reflex method of treatment has the advantage of a wide applicability and short duration of treatment. Some amount of cooperation and decision to stop drinking is essential in all of the treatments reported. The European tendency is to treat patients in special sanitariums; the American tendency is toward out-patient treatment. The ineffectiveness of punitive methods is obvious from this study.—*Authors.*

15820. WECHSLER, DAVID. (Bellevue Psychiatric Hosp.) The measurement of adult intelligence. 2d ed. xi + 248p. 9 fig. Williams and Wilkins Co.: Baltimore, 1941. Pr. \$3.50.—This adds to the first Edition (1939) a chapter on the clinical features of the Wechsler-Bellevue Scale and their diagnostic application; some rewording of test questions, and some new examples in the scoring directions of the comprehension, similarities, and vocabulary tests; 2 new tables giving the means and standard deviations of all the subtests of the Scale for ages 7 to 49; and several formulae for obtaining I. Q.'s for ages beyond those given in the original tables.—*C. A. Kofoid.*

ECOLOGY

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 G. D. FULLER, *General Plant Ecology*
 CHANCEY JUDAY, *Hydrobiology (Oceanography, Limnology)*

FREDERICK A. DAVIDSON, *Ecology of Wildlife Management—Aquatic*
 W. L. McATEE, *Ecology of Wildlife Management—Terrestrial*

ROBERT G. STONE, *Bioclimatology, Biometeorology*

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BIOCLIMATOLOGY, BIOMETEOROLOGY

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15821. PAULL, ALLAN E., and J. ANSEL ANDERSON. The effects of amount and distribution of rainfall on the protein content of western Canadian wheat. *Canadian Jour. Res. Sect. C. Bot. Sci.* 20(4): 212-227. 1942.—Data for 14 yrs. were used to determine the average effect of rainfall on the protein content of wheat grown at 7 stations in the dry belt of s-w. Saskatchewan. Employing the concept of a regressive integral, and working with the rainfall for

consecutive 5-day intervals from Apr. 1 to Aug. 3, a curve was obtained which represents the change occurring during the growing season in the average regression coefficient (i.e., the average unit decrease in protein content per unit increase in rainfall). 34% of the residual variance for protein content can be ascribed to variations in rainfall.

Above average rainfall during the growing season generally tends to reduce protein content, but this tendency is much more marked during Apr. and early May, and during the latter part of July. These are also the periods during which av. rainfall is lowest. The effect on protein content of precipitation occurring during the previous fall is of minor importance.—Auth. abst.

15822. RIMMER, T., and A. W. W. HOSSACK. I. An analysis of Queensland rainfall (1925-36). II. Queensland cyclones and their influence on monthly rainfall. III. Foreshadowing summer rain in Queensland. *Univ. Queensland Papers, Dept. Physics* 1, (1/3): 13, 15, 20. 1939.—Valuable preliminary statistical analyses of rainfall distribution according to different meteorological causes, which may serve as a basis for studies of long-range forecasts. The 1st paper shows that in the coastal and northern regions of Queensland whether a season were wet or dry depended mainly on instability and "cyclonic" (closed-isobars) rain, while in most of the interior it depended on the amt. of rain from frontal discontinuities other than cyclones. In the 2d paper the contribution of rain by different kinds (paths) of cyclones is compared by months and for various

districts. Many coastal cyclones meant heavy local falls, generally good average rain, whereas the rest of the country had poor falls. Northern cyclones (of summer) affected only the north section, mostly at only a few stations per month. Inland flat cyclones caused widespread rain, locally excessive. Cyclones cause $\frac{1}{3}$ of the good rains in Jan-Mar., less Apr.-July, very little in Aug.-Dec. The 3d paper applies Walker's methods to foreshadowing

The Past and Present of Biological Research

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summer rain; out of 8 yrs. beyond the data used for the coefficients, predictions with 4:1 chance of success give satisfactory verifications.—R. G. Stone.

15823. U. S. DEPT. AGRICULTURE. Climate and man. U. S. Dept. Agric. Yearbook 1941. xii + 1248p. Illus. 1942.—This is "the sixth in a series designed as a set of reference volumes for modern farmers dealing with all the important aspects of present-day agriculture in the United States." The first chapter is a summary of the entire volume, by the editor, GOVE HAMBIDGE; then follows a series of 36 chapters each by a well-known authority in the precise field covered—constituting an informative treatise (in a little over 600 pages of text), not too technical, of the fundamentals and the manifold applications of present-day meteorology and climatology. Noteworthy are the chapters "The Scientific basis of modern meteorology" by C. G. ROSSBY (p.599-655) and "How the daily forecast is made" by C. L. MITCHELL and H. WEXLER (p.579-698). The first half of the volume contains these and the following other chapters: "Climatic change through the ages," by RICHARD JOEL RUSSELL; "Climate and the world pattern," by DAVID I. BLUMENSTOCK, and C. WARREN THORNTWHAITE; "The how and why of weather knowledge," by F. W. REICHELDERFER; "The settlement of the humid east," by CARL O. SAUER; "Climate and settlement of the subhumid lands," by GLENN T. TREWARTHA; "Climate and settlement in the Great Plains," by C. WARREN THORNTWHAITE; "Climate and settlement of the arid region," by REED W. BAILEY; "Settlement and cultivation in the summer-dry climates," by JOHN LEIGHLY; "The colonization of northern lands," by VILHJALMUR STEFANSSON; "Climate and settlement in Puerto Rico and the Hawaiian Islands," by JAMES THORP; "Climate and future settlement," by JAN O. M. BROEK; "Comfort and disease in relation to climate," by JOSEPH HIRSH; "Health in tropical climates," by ROBERT G. STONE; "Climate and soil," by CHARLES E. KELLOGG; "Effects of climatic factors on growing plants," by A. C. HILDRETH, J. R. MAGNESS, and JOHN W. MITCHELL; "Influence of climate and weather on growth of corn," by MERLE T. JENKINS; "Climate and small grains," by S. C. SALMON; "Climate and sorghum," by J. H. MARTIN; "Climate and cotton," by C. B. DOYLE; "Climate and tobacco," by W. W. GARNER; "Climate and vegetable crops," by VICTOR R. BOSWELL and HENRY A. JONES; "Climatic adaptation of fruit and nut crops," by J. R. MAGNESS and H. P. TRAUB; "Climatic relations of sugarcane and sugar beet," by E. W. BRANDES and G. H. COONS; "Climate and forage crops," by O. S. AAMODT; "Climate and grazing," by W. R. CHAPLINE and C. K. COOPERRIDER; "Climate and the nation's forests," by RAPHAEL ZON; "Climate and plant diseases," by HARRY B. HUMPHREY; "Insects and the weather," by JAMES A. HYSLOP; "Climate and livestock production," by A. O. RHOAD; "Climate in relation to worm parasites of livestock," by JOHN T. LUCKER; "Flood hazards and flood control," by BENJAMIN HOLZMAN, G. W. MUSGRAVE, C. WARREN THORNTWHAITE, ALBERT K. SHOWALTER, C. L. FORSLING, ARTHUR C. RINGLAND, OTTO E. GUTHE, and MERRILL BERNARD; "The climates of the world," by WESLEY W. REED; and "Climate and weather data for the United States," by J. B. KINCER. The remainder of the volume is devoted to a series of chapters, each on the climate of one of the states (or territories or insular possessions) of the U. S., with many tables of data, and maps showing dates of earliest and latest killing frost, precipitation, av. January and July temp., etc.

15824. SWEENEY, O. R., F. E. CAMPBELL, and BURDETTE JONES. (Iowa State Coll.) The determination of the total fixed nitrogen content of power plant flue gases. *Iowa State Coll. Jour. Sci.* 16(2): 207-210. 1942.—The authors point out that coal contains 1.4% of fixed N and that, if this were recovered on combustion, it would contribute the equivalent of 32 million tons of $(\text{NH}_4)_2\text{SO}_4$. Ammonia and nitrogen peroxide added to the air from this source are washed into the soil by rain. The authors report results of studies to determine the quantity and economic

value of fixed N in flue gases and describe analytical methods. Tests on a representative commercial turbine boiler showed that the gases contained fixed N in ams. not greater than 0.1% of the total N in the coal. Use of catalysts or changes in boiler-operation conditions might increase this yield to a profitable value.—O. C. Magstad.

15825. THORNTWHAITE, C. W., and BENJAMIN HOLZMAN. Measurement of evaporation from land and water surfaces. *U. S. Dept. Agric. Tech. Bull.* 817. 1-143, 2 maps, 12 fig. 1942.—This study is an attempt to satisfy a long-felt need for a method of determining water losses to the atmosphere from land surfaces possessing various types of vegetal cover as well as from free water surfaces. Since the water entering the atmosphere becomes a gas and is invisible, direct methods such as those in use for measuring precipitation or runoff in streams cannot be employed. Recent studies of turbulence in the lower levels of the atmosphere have supplied essential information that makes possible the determination of the rate of transfer of moisture from a natural surface into the atmosphere. An equation is here developed that gives this rate of moisture transfer in terms of measurements of wind velocity and humidity at 2 levels directly above the surface. The formula giving evaporation in inches depth per hour is

$$E = \frac{833 k_0^2 (e_1 - e_2)(u_2 - u_1)}{(T + 459.4) \left(\log \frac{z_2}{z_1} \right)^2}$$

where k_0 is the universal turbulence having a value of approximately 0.4, e_2 and e_1 are vapor pressures in mm. of Hg and u_2 and u_1 the mean wind velocities in miles per hr. at heights z_2 and z_1 , respectively, and T is the air temp. in degrees F. The measurements of both wind velocity and humidity must be made with a high order of accuracy. Thus careful study of various types of hygrometers and anemometers was made and some new instruments were designed and tested. A salt hygrometer, a chemical-absorption hygrometer, and a dew-point recorder are described. An evaporation station was established over a meadow at the Exptl. Farm in Arlington, Va., in late autumn, 1938. The station was operated through 1939, and a nearly complete hourly record of evaporation and condensation from the field was obtained. Tables presented in the bulletin include hourly values of temp. and of specific humidity at 2 levels and hourly values of wind movement at 4 levels. They also include daily totals of condensation and evaporation; the 1st record of its kind ever made. There are a few unavoidable gaps in the record.—C. W. Thorntwaight.

ANIMAL

15826. BREDER, C. M. Jr. (New York Zool. Soc.) Descriptive ecology of La Cueva Chica, with especial reference to the blind fish, *Anoptichthys*. *Zoologica [New York]* 27 (1): 7-16. 3 pl. 1942.—Data are given on the physical and chemical features of the cave environment together with geographic and biotic details. The degenerate eye condition of the cave fish and its association with lack of pigmentation are discussed in relation to the gradient of these features extending inward from the river connection. The food chain to outside the cave is traced through the continual introduction of bat droppings.—C. Breder.

15827. ERRINGTON, PAUL L. (Iowa State Coll.) On the analysis of productivity in populations of higher vertebrates. *Jour. Wildlife Management* 6(2): 165-181. 1942.—This paper was prepared to assist students of productivity in avian and mammalian populations to guard against errors arising from neglect of compensatory trends in reproduction and loss rates. Some degree of increased breeding as a result of losses of eggs or of young can be expected for a considerable variety of higher vertebrates, and an analysis of productivity of a hypothetical species (similar in behavior to the ring-necked pheasant, *Phasianus colchicus torquatus*) is outlined as an illustration of technique.—P. L. Errington.

15828. HUEY, LAURENCE M. Mammalian invasion via the highway. *Jour. Mammal.* 22(4): 383-386. 1941.—Extension of range by pocket gophers (*Thomomys*) across a barren expanse of the Colorado Desert, between Holtville, Calif. and Yuma, Ariz., is recorded. In 1928 a cement road

was completed across this section. Since then the workings of the gophers have been observed as extending into the desert beside the highway for 37 miles at the west end and 3 miles at the east end. The controlling factor is believed to be a moist soil condition and more plant growth along the edge of the pavement, due to rain runoff and delayed evaporation.—*L. M. Huey.*

15829. PEARSE, A. S., H. J. HUMM, and G. W. WHARTON. Ecology of sand beaches at Beaufort, N. C. *Ecol. Monogr.* 12(2): 135-190. 24 fig. 1942.—To estimate populations, routine collections were made by using spades, rakes, salve boxes, sieves, diving hood, trawl, seine, and dredge. 7 stations were selected for detailed study; these included various types of sand beaches—shoals in sounds, abrupt slopes, flats, strands along the open sea, etc. Beaches contained little Ca and humus; O₂ was usually absent at depths of 5-10 cm. in sand; air was usually cooler than water and sand in summer and warmer in winter; salinities were all near those in the open ocean. In sand beaches abundant microscopic animals were nematodes, copepods, foraminiferans, polychaetes, ostracods, amphipods, and flatworms. Larger common intertidal animals were *Haustorius*, *Emerita*, *Donax*, polychaetes, *Chiridotea*, etc. Common shore fishes were *Menidia* and *Fundulus*; with them were *Callinectes* and other crustaceans. Just below low tide mark such animals as *Melitta* and *Terebra* were common. Beach animals are arranged more or less in zones. Typical examples of those that are most abundant at various levels are as follows: above high tide mark, *Ocypode*, *Talorchestia*; high tide mark, bacteria; between tides, *Haustorius*; low tide mark, *Emerita*, *Donax*; 0.5 m. below low tide mark, *Terebra*, *Melitta*, *Arenaeus*, *Lepidopa*; 10-15 m. deep, *Remilla*. Burrowing crustaceans are mostly of 3 kinds: (1) minute, slender forms that creep about between sand granules (copepods), (2) stocky forms that are expert burrowers with long antennae and remain near the surface, (3) slender forms that live in deep (1 m.) burrows and have special pumping organs for creating currents. *Emerita* has been described in some detail as an example of a sand-beach crustacean. Burrowing molluscs have either a wide, slimy foot and small shell and crawl with ease directly through sand, or have a slender foot that can expand at the end and give enough anchorage so that the animal can pull itself downward. Sand-beach animals usually lack colors and patterns, but some are colored like sand (*Ocypode*) and a few are speckled (*Ovalipes*, flounders). Most crustaceans have small eyes. Sand beaches contain enormous food resources; they are great digestive and incubating systems. Bacteria break down organic remains and continually supply the ocean with phosphates, N compounds, and other valuable materials. There are various types that can fix N and digest agar, cellulose, chitin, and other rather refractory organic substances. Bacteria, minute diatoms and other algae are eaten by protozoans, worms, echinoderms, crustaceans, molluscs, etc.; these in turn furnish food for fishes, birds, and other large animals. Microscopic beach organisms multiply very rapidly. Bacteria and protozoans may increase enormously in number in a few hrs. Many small beach animals (*Emerita*, *Donax*) are annuals, but larger animals (*Callinectes*) live several yrs. Reproduction is most active among beach animals during summer, but a few are breeding at all seasons. Sand beaches are not barren wastes, as they appear at first glance, but are swarming with life, and continually digest and furnish food to plants and animals. An appendix gives the names of animals found on Beaufort beaches.—*A. S. Pearse.*

15830. PENDLETON, ROBERT L. (Dept. Agric., Bangkok.) Some results of termite activity in Thailand soils. *Thai Sci. Bull.* 3(2): 29-53. Map, 12 pl. 1941.—Results of physical and chemical analysis of samples from 10 termite mounds from various parts of Thailand and of the associated normal soils are presented. The mound materials differ greatly from local soils, most strikingly as to pH and the occurrence of CaCO₃, together with increased replaceable bases and organic matter (perhaps due to replacement from low levels). Physically "the mound soils usually have a higher air dry moisture content, and their pore space is usually higher, and when sieved samples are subjected to the Keen-Raczkowski test" they "usually absorb more

water; and their volume expansion is usually greater." The surrounding soils are acid (pH 4.1-5.8), whereas the mound material has always a higher pH, nearly always on the basic side, often pH 8 or higher in the lower parts of the mound. Likewise, the Ca content of the fine earth of the mounds is always higher than in the surrounding soil. In 2 of the 10 mounds concretions made up 33% and 41%, respectively, of the sample from the base of the mound; the author believes that such concretions occur in all or most old mounds. The concretions contained, respectively, 35% and 18% of CaCO₃, although there are no known deposits of CaCO₃ available to the termites. Possibly the termites concentrate the CaCO₃ from the plant materials, and that this indicates use of the mound for long periods of time. These mounds average about 1 per acre throughout much of Thailand and allow for the growing of trees, shrubs, tobacco, etc., which do not do well in the acid, poorly drained surrounding soils. Judicious admixture of the mound soil enriches the land, but unless widely mixed they leave infertile areas often "gravelly," due to presence of calcareous concretions.—*S. F. Light.*

15831. PETERSON, RODGER T. Life zones, biomes, or life forms? *Audubon Mag.* 44(1): 21-30. 2 pl., 2 fig. 1942.—Life zones and biomes are equally unsatisfactory for describing bird distribution except in Canada where they tend to coincide, with temperature. Birds are most often restricted to climax growth of biomes and less so to sub-climates. The life form (physical aspect) of the environment seems to be the most important factor in limiting bird distribution and may account for irregular distribution in sub-climates. Other factors modifying bird distribution are climate, geography, competition, population pressure, and historic factors.—*J. A. Gray, Jr.*

15832. PUH, Y. CHIUNG. Beneficial influence of earthworms on some chemical properties of the soil. *Contr. Biol. Lab. Sci. Soc. China Zool. Ser.* 15(9): 147-155. 1941.—Earthworms (*Pheretima bucculenta*) have been cultured in pots with non-calcareous, purple-brown, loamy clay. The Ca deficiency was made up by adding calcareous sand, or the plant *Ipomoea aquatica* which is rich in Ca. They were able to live in as good condition in this artificial medium as in their natural environment. Determinations of the various constituents of the parent soil, and of the castings of the worms, yielded the following results. The reaction of the castings is always shifted to the neutral point, irrespective of the nature of the parent soil, whether acid or alkaline. The ams. of organic matter, base-exchange capacity, the total N, Ca carbonate, the available K and P were all found to be significantly increased. The exchangeable Ca was found to be unchanged. The significance of these increases in the soil is pointed out and probable sources of origin discussed. Their beneficial effect has been demonstrated by plant-culture expt.—*Auth. summ.*

15833. WATKIN, E. E. (Univ. Coll. Wales, Aberystwyth.) The macrofauna of the intertidal sand of Kames Bay, Millport, Buteshire. *Trans. Roy. Soc. Edinburgh* 60(Pt. 2, paper no. 16): 543-561. 1942.—A detailed study of the zonation of the macrofauna of Kames Bay is based on samples taken at intervals of every 5 yd. from H.W.M.N.T. to L.W.M.S.T. The 42 stations cover a horizontal range of 210 yd. and a vertical height of 11 ft. 6 in. The dominant groups represented are the Crustacea and the Polychaeta, together with the Lamellibranch *Tellina tenuis*. On the whole the Crustacea are more sharply zoned than the Polychaeta, with each species showing a more definite center of abundance. The spp. *Bathyporeia pilosa*, *Haustorius arenarius*, *Nereis diversicolor* and *Nerine cirratus* show a center of max. abundance at or above the H.W.M.N.T. The zone from H.W.M.N.T. to M.S.L. is dominated by *Ophelia cluthensis*, *Eteone flava* and *Eurydice pulchra*. From M.S.L. to L.W.M.N.T., *Pontocarcinus norvegicus*, *Urothoe brevicornis*, *Bathyporeia pelagica* and *Cumopsis goodsiri* are dominant spp. Below the L.W.M.N.T. to L.W.M.S.T., *Bathyporeia elegans*, *B. guilliamsoniana*, *Pontocarcinus arenarius* and *Pseudocarcinus cercaria* appear. *Tellina tenuis* extends from H.W.M.N.T. to L.W.M.S.T. gradually increasing in abundance, with the upper stations showing individuals with a more rapid growth rate and also the persistence of older age groups. Of the factors that may

determine zonation particular attention is paid to the size of the soil particles, and a mechanical analysis of soil samples ranging from H.W.M.S.T. to L.W.M.S.T. shows that the soil is very even over the whole tidal range, with particles of a size 0.2 mm. to 0.5 mm. accounting for over 80% of the samples. Comparisons with the analysis of soils given by other workers shows that soils of this composition carry high population densities. It is further shown that the mechanical composition of the soil is not in itself sufficient to account for the zonation, other factors must be considered.—E. E. Watkin.

15834. WILLIAMS, ELIOT C. Jr. An ecological study of the floor fauna of the Panama Rain Forest. *Bull. Chicago Acad. Sci.* 6(4): 63-124. 1942.—A report of a quantitative study of the fauna of the floor debris in the rain forest on Barro Colorado Island, Panama Canal Zone. The collections were made in July and Aug., 1938. Two sizes of quadrat were used, 11 of them were 1 m. square and 18 of them were 25 cm. square. Acarina and Collembola were collected by means of a Berlese funnel, larger forms by hand collection. Representatives of 5 phyla, 12 classes, and 37 orders were collected. Acarina, Collembola, and Hymenoptera (Formicidae) made up >80% of animals collected. Av. population based on 1-m. quadrats was 3,803 per sq. meter; that for 25-cm. quadrats was 9,822 per sq. m. Difference in these figures is due to some extent to more thorough collecting methods for the small quadrats; this material was taken to the laboratory for collection, while the large quadrats were collected in the field. Comparison of population densities with results of a chemical analysis of the soil did not show any correlation, except in the case of pH where there was a slight correlation between high population and a neutral pH. Increase in population during the wet season is indicated in the results, but comparison of data with results from a similar survey during the dry season will be necessary before this can be definitely demonstrated.—E. C. Williams, Jr.

PLANT

15835. BLAKE, S. T. (U. Queensland, Brisbane.) The vegetation of Goat and Bird Island in Moreton Bay. *Queensland Nat.* 11(5): 94-101. 1940.—Goat and Bird Islands are 2 tiny islands built on a fringing reef of dead coral formed round a focus of Mesozoic sandstone. Bird Island is merely a naked sand-bank but Goat Island is closely vegetated by a plant population of 64 spp. (list given) in 6 communities—mangroves, *Sesuvium* zone, *Sporobolus* zone, strand trees, *Lantana* thickets with small trees, and treeless areas dominated by *Imperata* and other grasses. A map shows the areas occupied by these communities and in addition the canopy-area of the more important woody plants. On the coral platform are developed 4 marine communities,—3 algal, and one of *Zostera* and *Halophila*.—S. T. Blake.

15836. GUSELNIKOV, E. P. [A new instrument to cut the grass on the experimental meadow and steppe squares.] *Bot. Zhurnal SSSR (Jour. Bot. USSR)* 23(5/6): 463-468. 1938.—A detailed description is given of a suggested instrument for this purpose.—G. Krotkov.

15837. HANSEN, HENRY P. (Oregon State Coll.) A pollen study of lake sediments in the lower Willamette Valley of western Oregon. *Bull. Torrey Bot. Club* 69(4): 262-280. 1942.—Three profiles of lake sediments in the lower Willamette Valley of western Oregon record by the tree pollen preserved therein 3 significant trends of post-Pleistocene forest succession. The forests existing at the beginning of the postglacial period consisted chiefly of *Pinus contorta*, *Picea sitchensis*, and *Abies grandis*. These were gradually replaced by *Pseudotsuga taxifolia* which remained generally predominant to the present time. In the upper half of the profiles *Quercus garryana* became abundant and at some levels superseded *Pseudotsuga taxifolia*. It then declined to the surface. The initial predominance of *Pinus contorta*, *Picea sitchensis*, and *Abies grandis* suggests a moist climate with unstable edaphic and physiographic conditions during the early part of the post-Pleistocene. The increase of *Pseudotsuga taxifolia* denotes a gradual drying of the climate and stabilization of the soil and physiographic conditions. The influx of *Quercus garryana* signifies further desiccation of the climate, while

its decline near the top depicts a slight increase in moisture in recent time. The abundance of *Pinus contorta* and *Picea sitchensis* is interesting because these species were absent from the Willamette Valley at the time of the advent of white man, as they are today.—H. P. Hansen.

15838. HOWARD, JULIAN A., and WM. T. PENFOUND. (*Tulane U.*) Vegetational studies in areas of sedimentation in the Bonnet Carré Floodway. *Bull. Torrey Bot. Club* 69(4): 281-289. 3 fig. 1942.—The vegetational changes which occurred in the Bonnet Carré Floodway, subsequent to its use during the late winter of 1937, are reported. The flood waters had no observable direct effect on the preexisting vegetation but the sediments, often in the form of dunes, destroyed the herbaceous plants and much of the woody vegetation. On the dune ridges a pioneer community, dominated by *Panicum capillare* and *P. dichotomiflorum*, soon established itself. In the barren swales between the ridges a wet phase of the same community, dominated by *Cyperus esculentus* and *P. dichotomiflorum*, became established. This pioneer vegetation is quite unlike that of the strand flora of the Gulf Coast but quite similar to that of the sandbars of the Mississippi River.—W. T. Penfound.

15839. KUHLMANN, J. G. (*Inst. Biol. Vegetal, Rio de Janeiro.*) Notas biologicas sobre Lentibulariaceas. *Anais Primeira Reun. Sul-Amer. Bot. [Rio de Janeiro]* 3: 311-318. 4 fig. 1938.—General observations on the physiological function of the "bladders" of some spp. of *Utricularia*.—J. P. Carabia.

15840. LEMÉE, M. G. Recherches écologiques sur la végétation du perche. *Rev. Gen. Bot.* 51(605): 300-319, 368-379. 1939.—The soils covered by oak-beech forests are analyzed as to the depth of each horizon, texture, mineral composition, structure, organic content of each part of the profile, pH, amt. of nitrification, aeration, and the water- and air-holding capacity. The *Quercetum ilecetosum* is least favorable to natural regeneration due to much raw humus, a deficiency of minerals, by absence of nitrification due to acidity, and by a hard pan. The *Quercetum sessiliflorae occidentale* has highly podsolized soil with vegetation adapted to acid, xerophytic conditions and moderate conditions of light. The *Quercetum roboris parisense* is characterized by great acidity, poor aeration. The *Querceto-Holcetum* has peculiar edaphic properties relating to microclimatic conditions. Phanerophytes of which one is a liana form the main body of the vegetation. Nanophanerophytes are represented by *Vaccinium myrtillus*.—Blanche McAvoy.

15841. LOVELL, HARVEY B. (U. Louisville.) Ecology of Kentucky flowers: I. *Claytonia*, *Mertensia* and *Jeffersonia*. *Trans. Kentucky Acad. Sci.* 9(2): 43-47. 1941.—The changes through which the flowers pass during anthesis are traced for *Claytonia virginica*, *Mertensia virginica* and *Jeffersonia diphylla*. The first 2 are commonly cross pollinated by insects, the latter very uncommonly.—R. H. Weaver.

15842. LÜDI, W. Beitrag zur Bildungsgeschichte der Luzernerallmend. *Vierteljahrsschr. Naturforsch. Ges. Zürich* 83(1/2): 113-130. Illus. 1938.—The Luzernerallmend (former city commons) occupies the alluvial plain of a creek (Krienzbach) from Mt. Pilatus. Constructional work necessitated 6 drillings along its edge, of which only the longest core (18 m.) provided satisfactory samples for pollen analysis, mainly in its shales and clays, less in its peat horizons. The following forest succession was found: *Pinus-Corylus*—mixed oak with *Corylus*—Mixed oak—*Abies-Abies* with *Picea*. *Fagus*, at present dominant, is scarce even in the highest analyzable horizon (30 cm.). Comparisons with published and unpublished analyses of other Swiss localities indicate that the beech penetrated the area after the *Abies-Picea* stage. Absence of local sedimentation during the *Fagus* stage advance explains the lack of its pollen. Other evidence indicates that the level of Lake Lucerne, which determined the rate of sedimentation by the Krienzbach, was at least 3 m. higher than today during the *Abies* dominance, and at least 3 m. lower than today during the Neolithic or Bronze Age.—J. E. Kessel.

15843. MCILVANIE, SAMUEL K. (U. S. Soil Conserv. Serv. *Ekalaka, Mont.*) Grass seedling establishment, and productivity—overgrazed vs. protected range soils. *Ecology* 23(2): 228-231. 5 fig. 1942.—Broadcast seeding of *Panicum*

antidotale and *Eragrostis lehmanniana* on undisturbed soil samples of overgrazed and protected desert grassland range, and pot-test productivity were studied in the greenhouse of the U. of Arizona. Special technique was employed to simulate natural conditions. Successful establishment was obtained on bare overgrazed soils, but no seeds germinated on the protected soils. Microphotographs revealed a dense algal and moss layer on the latter soil, which apparently prevented soil contact with the grass seeds. The fine seeded *E. lehmanniana*, though less viable, was incorporated into the bare overgrazed soil by action of artificial rainfall, while the large seeds of *P. antidotale* remained mostly on the surface in dry condition. In pot-tests with corn, sunflower, *E. lehmanniana* and *P. antidotale* yields averaged twice as high on the protected soil as on the overgrazed; top/root ratios were essentially equal. Factors other than nutrient balance apparently accounted for the differences in yield.—*S. K. McIlvanie.*

15844. NEAL, JESSE H. The effect of the degree of slope and rainfall characteristics on runoff and soil erosion. *Res. Bull. Missouri Agric. Exp. Sta.* 280. 1-47. 7 fig. 1938.—A Putnam silt loam surface soil from a timothy meadow was placed in a wooden soil tank 12 ft. long, 3.63 ft. wide (area = 1/1000 acre) and 2 ft. deep. The set-up was in a greenhouse. Artificial rain was applied by an overhead sprinkling system. Runoff and soil losses were detd. at 10-min. intervals under cultivated conditions for (1) slopes ranging from 0 to 16%, (2) rainfall intensities ranging from 0.9 to 4 inches per hr., (3) rain duration ranging up to 6 hrs. and (4) different initial moisture contents and surface conditions of the soil. Infiltration was not affected by either the slope or the rainfall intensity, but varied inversely as the initial soil moisture content. The % of slope had no apparent effect on the % of runoff for slopes above 1%. The % of runoff increased as the rain intensity increased but at a decreasing rate. When the soil was dry before a rain, runoff did not occur until several min. after the rain started. The time, elapsing between the beginning of the rain and the time when runoff occurred, decreased as both the slope and the rainfall intensity increased. After runoff started there was a continual increase in the rate until the infiltration rate had become approx. constant. This occurred 1-2 hrs. after the beginning of the rain. After 1-2 hrs. the runoff was approx. constant. Density of the runoff material decreased during the first hr. of a rain. When the rain continued longer, the density remained approx. constant. 1½-2 times as much runoff was required to remove a pound of soil at the end of 1 hr. as at the beginning of the rain. The relative density of the runoff material increased as both the slope and the rainfall intensity increased. The soil losses from a saturated soil increased as the 0.7 power of the slope, the 2.2 power of the rainfall intensity, and directly as the time of duration of the rain. The amt. of erosion from a soil which was in a dry condition at the beginning of the rain was affected by the initial soil moisture content and the condition of the soil surface, in addition to the degree of slope, the rainfall intensity and the duration of the rain. The soil in a dry pulverized condition or one in a dry rough condition absorbed much more rainfall than when in a smooth, hard, baked condition.—*Auth. summ.*

15845. OOSTING, HENRY J. (Duke U.), and W. D. BILLINGS (U. Nevada, Reno). Factors effecting vegetational zonation on coastal dunes. *Ecology* 23(2): 131-142. 1942.—Dunes at Fort Macon, N. Carolina, are directly exposed to ocean winds. Mapped transects from high tide level to the crest of the rear dunes indicate a zonation of the major dominants with *Uniola paniculata* predominating on the ocean side of the foredune and the crest of the rear dune, *Andropogon littoralis* in protected areas, and *Spartina patens* only where flooding occurs. Soil moisture, soil temp., soil pH, air temp., rel. humidity, evaporation and soil salt content were studied at stations established in the several zones and no correlation was found between these variables and the distribution of vegetation. Wind-borne salt was detd. with especially designed "salt traps" and it was found that areas of *Uniola* predominance are subject to high atmospheric salt content but *Andropogon* dominates only in areas protected from salt spray. Phytometer studies

corroborated field observations. Daily spraying with seawater was seriously detrimental to *Andropogon*, affected *Uniola* only slightly, and *Spartina* not at all. Watering with seawater killed *Andropogon*, was somewhat unfavorable to *Uniola*, and did not affect *Spartina*. The zonal distribution of the major species is therefore explainable on the basis of tolerance to wind-borne salt.—*H. J. Oosting.*

15846. PERESVÉTOV, A. E., and G. I. GRÚZDEV. (Vegetation in Ramenskoe flood-plain.) *Pochvovédenie (Pedology)* 33(2): 856-879. 1938.—Survey of native vegetation and of the soils of a section of the Moscow river valley indicated desirability of drainage, elimination of peat, and other meliorative measures to increase the yields of hay.—*V. P. Sokoloff.*

15847. RAWITSCHER, F. (U. São Paulo.) Sobre a reprodução vegetativa no gênero *Kalanchoe*. [With Eng. summ.] *Univ. São Paulo Bol. Fac. Phil. Sci. e Letras Bot.* 2: 3-10. 10 fig. 1939.—The author, studying *K. tubiflora* and *K. daigremontiana*, reports on the mechanical function of the "claws" or "pegs" which upon stimulation catapult the plantlets to a distance of 1-1.5 m. from the mother plant.—*J. P. Carabia.*

15848. RAYNER, M. C., and IDA LEVISOHN. (U. London.) The mycorrhizal habit in relation to forestry. IV. Studies in mycorrhizal response in *Pinus* and other conifers. *Forestry* 15: 1-36. 6 pl. 1941.—This paper gives an account of mycorrhizal association in a number of conifers, observed during 10 years' intensive study of exptl. sowings and plantings in an afforestation area in southwestern England. The spp. receiving special attention are Scots pine, Corsican pine, Lodgepole pine, Sitka spruce, Norway spruce and Lawson's cypress. Evidence is presented that the establishment and maintenance of correct mycorrhizal equipment in the conifers named are a formal condition for their normal and healthy growth under the soil conditions described. Soil inoculation with mycorrhiza-formers in pure culture or in humus has made evident the delicacy of response in mycorrhizal activities, and the sensitiveness with which mycorrhizal structure reacts to edaphic changes. One fungus species, *Boletus bovinus*, is mainly responsible for mycorrhiza-formation in pines in the afforestation area. It has been isolated from mycorrhizas of Scots pine and Corsican pine and studied in pure culture on various synthetic media. Another mycorrhiza-former, and certain soil fungi that attack roots and mycorrhizas (forming pseudomycorrhizal associations) have also been isolated and their reactions studied in pure culture. The bearing of these observations on the mycotrophic habit in trees and their significance in ecological relationships as a whole are discussed.—*M. C. Rayner.*

15849. SCHÁPOVA, T. F. (Vegetation of the bottom of Komsomolets (Dead Kultuk) and Kaidak bays of Caspian Sea.) *Bot. Zhurnal SSSR (Jour. Bot. USSR)* 23(2): 123-144. 1938.—56 km² of the bottom surface support ca. 600,000 tons' vegetation. Max. observed yield is 10-12 kg./m.². Despite high salinity, only 4 out of 22 spp. are marine: *Zostera nana*, *Polysiphonia sanguinea*, *Acrochaetium thuretii*, and *Cladophora nitidi*. Others are the typical flora of fresh and brackish waters.—*V. P. Sokoloff.*

15850. SMIRNOVA, Z. N. [Plant associations of the island of Kolguev.] *Bot. Zhurnal SSSR (Jour. Bot. USSR)* 23(5/6): 413-462. 1938.—The plant associations of Kolguev island may be classified into the following communities: arctic scrub; moss-lichens; mosses; taller scrub; mesophytic grassland; and tundra bog. A detailed description is given of these.—*G. Krotkov.*

15851. STORK, H. E. Hardiness of woody plants in Minnesota. *Proc. Minnesota Acad. Sci.* 9:22-27. 1941.—Due to the continental climate of Minnesota the number of woody species available for ornamental use is limited. To increase the number the following means are discussed: Introduction of spp. and vars. now unknown in the state; widening the acquaintance with the spp. that are hardy but little known; acclimatization of plants by judicious choice of soil, exposure, and in some cases by supplying protection; breeding for hardiness; selecting for hardiness. Examples are given from experiences with woody plants in the Garleton Arboretum and elsewhere in the state to illustrate the above methods.—*H. E. Stork.*

15852. TEMNÓEV, N. I. (Meadow flora of the mountain-steppe region of Southwest Altai.) *Botanicheskiy Zhurnal SSSR (Jour. Bot. USSR)* 23(2): 166-182. 1938.—*Festuca rubra* and *Phleum pratense*, common in the adjoining forest zone, are absent in both flood-plain and low-mountain meadows at 420-1000 m. above the sea level. Mosses are also absent. The Jaccard coefficients of the flora of the 2 kinds of meadows are 42.1.—V. P. Sokoloff.

15853. TREWARTHA, G. T. The vegetal cover of the Driftless Guestaform hill land: Pre-settlement record and postglacial evolution. *Trans. Wisconsin Acad. Sci., Arts and Lett.* 32: 361-382. Maps, illus. 1940.—The region here designated is that part of the inner basin of the Upper Mississippi unmantled by recent till sheets, where the local relief usually exceeds 250 ft.—Courtesy *Plant Sci. Lit.*

15854. VASIL'EV, V. F. (Introduction of new plants on the chalk exposures of the Voronezh District.) [In Russ. with Eng. summ.] *Trudy Voronezhskogo Gosudarstvennogo Universiteta (Acta Univ. Voronegiensis)* 10(5): 17-37. 1939.

15855. YOUNG, H. E. (Dept. Agric., Brisbane.) Mycorrhizas. *Queensland Nat.* 11(6): 121-126. 1941.—In ectrophic mycorrhiza, the fungus is external to the root, but in endotrophic mycorrhiza, the fungus is chiefly within the root tissue. The former occurs in *Eucalyptus* and *Pinus*, the latter prevails in *Araucaria* and *Citrus*. Frank in 1880 showed that most trees are mycorrhizal. In 1925 Melin, in Sweden, showed that in most cases mycorrhiza were essential for plant growth. The failure in growth of seedlings in many forest nurseries has been due to the absence of the requisite fungi in the soil, Australian examples being *Araucaria cunninghamii*, *Pinus radiata* and *P. taeda*. The fused needle disease of various spp. of pine has been traced to the unhealthy state of the mycorrhiza, due to the lack of organic matter in the soil, and has been remedied by the application of phosphate.—S. T. Blake.

OCEANOGRAPHY

(See also Entries 15865, 17224, 17256)

15856. ALLEN, W. E. Methods of field and laboratory procedure in phytoplankton research at the Scripps Institution of Oceanography of the University of California. *Proc. Sixth Pacific Sci. Congr.* 3: 525-528. 1939(1940).—All routine, quantitative collecting of phytoplankton, for more than twenty years at the Scripps Institution of Oceanography, has been done by "measured water" methods. Since 1929 the method of collecting by settling of organisms after killing in a one liter graduate has been practiced at the Institution pier. At other inshore stations, as well as at all off shore stations, collecting by filtration of 5-25 l. of sea water through #25 bolting silk has been practiced. Most of the 26,000 catches obtained were examined under a compound microscope, by sample in a Sedgwick-Rafter slide, to obtain both quantitative and qualitative records.—W. E. Allen.

15857. ALLEN, W. E. Indicator value of phytoplankton. *Proc. Sixth Pacific Sci. Congr.* 3: 529-531. 1939(1940).—20 years of experience with marine plankton diatoms and dinoflagellates (phytoplankton) at the Scripps Inst. of Oceanography has shown clearly that they have distinct importance as indicators of seasonal, annual, geographical, hydrographical, chemical, and physical differences in the oceanic environment. E.g., 1926 and 1931 were warm water yrs. in which production was poor. Also, stations in some localities (Farallone Is., notably) never yielded large numbers, while other stations rarely showed so poorly as they. Also, systematic off-shore cruising in Southern California revealed regions of good and poor productivity in direct relationship to movements of the great water masses. And, abundance of diatoms at certain stations was found to have a definite relationship to chemical characteristics of the sea water.—W. E. Allen.

15858. DOMANTAY, JOSE S. Report on the marine fauna of the western part of Lingayen Gulf. *Proc. Sixth Pacific Sci. Congr.* 3: 97-100. 1939(1940).—The characters of the shore and bottom in the different subdivisions of the western part of the gulf are discussed, together with the distribution of the invertebrates found in these subdivisions, such as the crabs, jellyfishes, gastropods, corals, starfishes, sand dollars, and sea urchins.—Chancey Juday.

15859. MOTODA, S. (*Hokkaido Imp. U.*) Comparison of the conditions of water in the bay, lagoon, and open sea in Palao. *Palao Trop. Biol. Sta. Stud. [Tokyo]* 2(1): 41-48. 2 fig. 1940.—11 sets of data over a year show no notable comparative differences of temp. and O₂ conc. above 50 m. Transparency was respectively 8-11, 11-18 (once 28), and 17-36.4 m. Specific gravity occasionally, and pH usually had slight, similar gradients. Average numbers of microplankton per 40 l. were 3009, 1873, and 782; macroplankton was most abundant in the lagoon.—L. W. Hutchins.

15860. MOTODA, S. (*Hokkaido Imp. U.*) The environment and the life of massive reef coral, *Goniastrea aspera* Verrill, inhabiting the reef flat in Palao. *Palao Trop. Biol. Sta. Stud. [Tokyo]* 2(1): 61-104. 9 fig. 1940.—The sp. inhabits the middle zone of the flat. Tidal and weather variations caused wide fluctuations in the environment: temp., 26-39° C.; pH, 7.83-8.6; specific gravity (σ_{45}), 17.0-26.18; O₂, 1.93-6.67 cc./l.; silt, 0.15-45 cc./20 l. Calculated for 10 polyps, O₂ liberation by photosynthetic symbiotic zooxanthellae is 0.14-0.22 in good weather, 0.12-0.15 in cloudy weather, and consumption is 0.08 cc./hr. at 6 cm. depth in thickly clouded weather. Respiration is 0.11, and net 24-hr. good weather balance is -0.03. O₂ production increases with decrease in depth. 2 hrs.' exposure out of water to bright sunlight is not harmful, but 6 hrs. kills most polyps, beginning with those uppermost in the colony; 9 hrs. is withstood in shade or cloudy weather. Partial immersion in tide pools and contact with moist sand probably assist resistance to longer exposures during spring low tides. Colonies transplanted to zones near shore and the reef margin were respectively buried by mud and destroyed by fish.—L. W. Hutchins.

LIMNOLOGY

(See also Entry 17258)

15861. LACKEY, JAMES B. (*U. S. Publ. Health Serv.*) The effects of distillery wastes and waters on the microscopic flora and fauna of a small creek. *Publ. Health Repts.* 57(8): 253-260. 1942.—Examination of weekly samples taken over a 16-months period showed that the effluents from whiskey distilleries, unless highly diluted, created a high B.O.D. accompanied by an O₂ depletion, in a small creek. Such wastes killed about 90% of the microscopic organisms, bacteria excluded, but allowed the development of a few spp. including some characteristic of high organic, O₂-free waters, together with 5 genera of green flagellates and ciliates not heretofore found in abundance by the writer.—J. B. Lackey.

15862. MOTODA, S. (*Hokkaido Imp. U.*) Submarine illumination, silt content and quantity of food plankton of reef corals in Iwayama Bay, Palao. *Palao Trop. Biol. Sta. Stud. [Tokyo]* 1(4): 637-649. 2 fig. 1939.—Transparency at 16 stations was 5-28 m. Blue wave-length illumination (3600-5000 Å) detd. photochemically was 7-75% of surface illumination at 10 m. Secchi disk disappearance corresponded to 11-52% of surface light. Silt content, as high as 3, averaged 0.7 cc. per 20 l. Vertical noon hauls with a No. 3 Müller gauze net showed macro-plankton numbers up to 30.8 per 10 l.; highest values were in deep, still layers of large water masses. Common reef corals can thrive vigorously at least with illumination 30-40% of surface light, and in the presence of 0.7 cc. silt per 20 l. at 10 m. Failure to develop may be due to lack of proper substrate conditions, excess silt, or insufficient light.—L. W. Hutchins.

BIOLOGICAL ABSTRACTS

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GENERAL BIOLOGY

Editors: A. H. GRAVES, *Plant*; C. A. KOFOID, *Animal*

(See also Entries 17357, 17358, 18894, 19352)

INSTITUTIONS, ADMINISTRATIONS

17335. EMERSON, HAVEN. (*Columbia U.*) (Editor.) Administrative medicine. xviii + 839p. Illus. Thomas Nelson and Sons: New York, 1941. Pr. \$10.50.—This volume, containing 53 concise chapters written by men and women preeminent in their respective fields, is best described by quoting the editor: "With the growth of specialization in medical training, skills, and experience, and in part as a sequel of the elaboration and great expense of apparatus for diagnosis and treatment of disease, and still more because of inclusion of the application of preventive and curative medicine among the functions of civil government, there has been an increasing diversion of profession personnel and of collective financial resources from the individuals to the organized use of medical arts and sciences over the past 50 years and more. . . ." "It is primarily to bring to physicians a more precise description of the functions and organization of these institutions and agencies that persons of experience and authority in the various special fields of administrative medicine have collaborated as authors of this volume. . . ." The volume may help, "to correct a common tendency among physicians to concern themselves only with the medical and health needs of their private patients." —R. Buerki.

17336. ANONYMOUS. Organisation of science. *Sci. and Culture* 7(3): 132-133. 1941.—There is an urgent need in India for dissemination of scientific knowledge and the application of this knowledge to a program of national welfare. The Indian Science News Assn. will play an important rôle in this. There is an unfortunate hiatus between science and industry in India,—greater than in other countries, and many people trained in science eventually turn to law and business rather than remain in an as yet unappreciated field. There should be closer coordination or connection between science and industry. The Indian government has initiated certain constructive measures such as setting up a Board of Scientific and Industrial Research and an Industrial Research Utilization Committee. India badly needs a set of interrelated institutes connecting the most abstract and fundamental science with everyday problems of home and factory.—This article was an adaptation from a speech delivered by N. R. Sarker before the Indian Science News Assn. on Aug. 12, 1941, in Calcutta.—M. D. Rogick.

A Grateful Acknowledgment of Services Rendered

Upwards of 2,000 biologists write the abstracts that appear month after month in *Biological Abstracts*. It is not generally appreciated, however, that these scientists contribute their services for no remuneration whatever—they do not get even a free subscription to a section.

Boiling down an article to a few brief sentences is painstaking work requiring a thorough knowledge of the subject. If we had to pay for this work it would greatly increase the cost of producing *Biological Abstracts*—and in order to survive we would have to increase the subscription prices. These collaborators, therefore, are making a substantial contribution to the biological sciences and have earned the undying gratitude of the present and future generations of biologists throughout the world. You can express your appreciation by supporting their work in the form of a subscription to the section covering your field (see inside front cover).

TEXTS AND EDUCATION

17337. DARRAH, WILLIAM C. An introduction to the plant sciences. xii + 332p. 156 fig. John C. Wiley and Sons: New York, 1942. Pr. \$2.75.—This textbook is based upon a non-technical survey course in general botany of one semester as given at Harvard Univ. to students presumably not planning further courses in that field. It presents the major biol. concepts as applied to plants. It is primarily physiological in treatment and emphasizes the relations of botany to the other sciences, to industry, and to human welfare. The topics treated include the nature of living matter, the cell and aggregations of cells, the structures and functions of the plant body, metabolism and movement of materials in plants, growth and reproduction, the organism and its environment, the earth as a place for life, the plant kingdom and its subdivisions, genetics, evolution, and a brief history of the plant sciences. An extensive glossary is added.—C. A. Kofoid.

17338. RIDDLE, OSCAR (editor), et al. The teaching of biology in secondary schools of the United States. A report of results from a questionnaire. 76p. Committee on the Teaching of Biology: 1942.

17339. SWINGLE, D. B. (*Montana State Coll.*) Plant life: A textbook of botany. 2d ed. xvi + 457p. Frontispiece, 295 fig. D. Van Nostrand Co., Inc., New York, 1942. Pr. \$3.—This textbook of botany is very similar to the 1st edition. In several cases, certain pages were rewritten and thereby clarified for the beginning student. The book is divided into 8 parts with emphasis on physiology and the behavior of plants. The material presented is suitable for a 1-semester course in botany.—O. J. Eigsti.

17340. UNGER, W. BYERS, and C. E. MORITZ. (*Dartmouth Coll.*) A laboratory manual for elementary zoology. iv + 108p. Ginn and Co.: Boston, 1942. Pr. \$1.25.—This is at once a laboratory guide and notebook, since each exercise is printed compactly facing a blank page on which the student is expected to keep corresponding memoranda. It begins with a brief glossary of preliminary terms, followed by a description of the microscope and directions for its use and care. The plan of study is to cover the main animal groups according to phyla. The remainder of the exercises cover physiology and anatomy of the kidney, the nervous system, the skeletal system and there are brief considerations of vertebrate embryology, histology and cytology.—W. F. Diller.

MISCELLANEOUS

17341. CARSON, RACHEL L. (*U. S. Fish and Wildl. Serv.*) Under the sea-wind. A naturalist's picture of ocean life. [Illus. by HOWARD FRECH.] xix+314p. 8 pl., 27 fig. Simon and Schuster: New York, 1941. Pr. \$3.—The author treats in a non-technical way, the regions of the sea-coast, open ocean, continental shelf, and deep water from the Carolinas to the Arctic through the seasons of the year. The division is into 3 books: Book I deals with shore birds, small mammals, and invertebrates, and shallow water fishes noting their means of livelihood, dangers, companions, and activities through calm and storm and during tidal changes; bird migrations to the Arctic and back are discussed. Book II concerns the open ocean, dealing mainly with the mackerel, its habits, development, and migration. Book III follows the migration of the spawning eels from fresh waters to the sea, and the migration from deep water back to fresh water and the metamorphosis of the young eels. A chapter is devoted to the deep sea as a winter haven for fishes seeking sub-freezing temperatures. Throughout the book, man's use of the sea as a source of food has attention, and the predator-prey relationship among animals is prominent. There is a glossary of almost 150 terms.—*Mary Gojics.*

17342. MCCOLLUM, CHARLES H. Pills and proverbs. 225p. Frontispiece, 6 pl., 2 fig. Meador Publishing Co.: Boston, 1941. Pr. \$2.—An impressionistic, semi-humorous autobiography. Born on a farm in Lincoln County, Tennessee, during the period of post Civil War poverty, the author became a country doctor and, after studying in Germany, a distinguished surgeon in Fort Worth, Texas. The greater part of the book deals with reminiscences of interesting medical cases.—*Conway Zirkle.*

17343. RATCLIFF, JOHN D. Science year book of 1942. xxvii+279p. Doubleday, Doran and Co.: Garden City, 1942. Pr. \$2.50.—A collection of some of the best popularly written magazine articles of 1941, with an introduction written by Ratcliff. The Klystron Boys, by FRANK J. TAYLOR in *Sat. Eve. Post*; The Electric Eye, by HARLAND MANCHESTER in *Atlantic Monthly* and *Reader's Digest*; The Electron Microscope, by THEODORE A. SMITH in *Sci. Mo.*, reviews principles and history of this instrument; When the Thunder-God Strikes, by JAMES FINAN in *Scribner's Commentator* and *Reader's Digest*; Chemistry Builds a New World, by MAXINE DAVIS in *Cosmopolitan*; New Hope for the Leper, by ROSCOE FLEMMING in *Colliers*, gives relation between taro, degeneration of adrenals, and leprosy and use of diphtheria antitoxin for treatment; Life Begins with Vitamins, by WILLIAM L. LAURENCE in *Ladies' Home Jour.*, brief history of vitamin B complex "composed of at least 16 vitamins"; Do Your Eyes See Alike, by ALBERT E. WIGGAM in *Cosmopolitan*, treatment of aniseikonia by special spectacles; Turning the Mind Inside Out, by WALDEMAR KAEMPFFERT in *Sat. Eve. Post*, use of psychosurgery for treatment of nervous tensions, etc.; Front Line against Cancer, by ROBERT COOK in

Colliers', story by Roscoe B. Jackson Memorial Laboratory, cancer apparently transmitted by something in milk; Fate Joins the Flu Fighters, by LOIS MATTOX MILLER in *Hygeia* and *Reader's Digest*, history of development of flu vaccine; Humble Healers, by ROBERT McCORMACK in *Colliers*, allantoin, urea, and ammonium bicarbonate; Chicago against Syphilis, by PAUL de KRUIF in *Reader's Digest*; Sister Kenny vs. Infantile Paralysis, by LOIS MATTOX MILLER in *Reader's Digest*; The Surgeon Follows the Bombs, by HANNAH LEES in *Colliers'*, new development in war surgery; Hungry Nerves, by HANNAH LEES in *Colliers'*, clinical applications of vitamin B, discoveries for d.t.s., etc.; Famine Fighters, by JAMES RORTY in *Colliers'*, dehydrated condensed rations; Plan for Parenthood, by GRETTA PALMER in *Ladies' Home Jour.*; Heredity and the Hope of Mankind by BRUCE BLIVEN in *New Republic* and *Reader's Digest*, "in Mendel's famous experiment, a true breeding form of red peas was crossed with white ones"; The Mystery of Aging, by GEORGE W. GRAY in *Harper's*; The Sky's no Limit for Dr. Moss, by HARLAND MANCHESTER in the *Toronto Star Weekly* and *Reader's Digest*; Future of the Helicopter, by IGOR SIKORSKY in *Aero Digest*; The Tragedy of Rudolf Diesel, by Dr. HENRY CREW in *Sci. Mo.*, life of inventor of Diesel motor; Daylight in Tubes, by HARLAND MANCHESTER in *Atlantic Mo.*, fluorescent lights; Radio for the Future, by GILBERT SELDES in *Atlantic Mo.*, facsimile, television, and FM; We Eat if They Do, by S. DILLON RIPLEY in *Colliers'*, birds; A Revolution in Southern Agriculture, by J. SIDNEY CATES in *Country Life* and *Reader's Digest*, soils, crops, and livestock; Research Unlocks the Secret of Cotton, by J. SIDNEY CATES in *Country Gentleman*, new measure of strength of fibers by X-ray photomicrography; Harnessing Earthworms, by JOHN EDWIN HOGG in *Nature* and *Reader's Digest*, earthworm culture; Additional Worm Notes, by Dr. GEORGE SHEFFIELD OLIVER in *Nature*; A Native Returns to the Amazon, by DESMOND HOLD-RIDGE in *Living Age* and *Reader's Digest*, rubber; What! No Spinach, by DEAN JENNINGS in *Cosmopolitan*, shortage of garden seeds leading to American development of new industry and new varieties; Miles of Mushrooms, by MONA GARDNER in *Colliers'*, mushroom culture; Food Banks of the Future, by RAY P. CALT and HIRAM K. SMITH in *Atlantic Mo.*, low temperature locker plants.—*L. J. Gier.*

17344. WEATHERWAX, PAUL. (*Indiana U.*) Plant biology. vi+455p. 182 fig. W. B. Saunders Co.: Philadelphia, 1942. Pr. \$3.25.—A beginners' textbook, designed primarily for one-semester college courses in elementary botany and for the botany part of general biology courses. It treats of cell structure and function, diffusion and osmosis, sources and utilization of food and discusses the nature and work of leaves, roots and the soil. A chapter is devoted to the fundamentals of genetics as they apply to botany. Plant communities and general questions of ecology are considered.—*Anne Herkner.*

BIOGRAPHY, HISTORY, AND BIBLIOGRAPHY

Editors: CARROLL W. DODGE, EILEEN R. CUNNINGHAM, T. C. RUCH, JUDITH W. HUNT

(See also Entries 17918, 17931, 18205, 18965)

HISTORY

17345. CLARK, PAUL F., and ALICE SCHIEDT CLARK. (*U. Wisconsin Med. Sch.*) Memorable days in medicine. A calendar of biology and medicine. 305p. Frontispiece, 7 pl. University of Wisconsin Press: Madison, 1942. Pr. \$2.—This unique book, which was first published serially in briefer form in *Medical Life* during 1936-1937, is organized, as the title suggests, as a calendar of memorable events and of brief biographical sketches of famous characters in the history of medicine and its allied sciences. Included are the anniversary dates of (1) the founding of medical faculties and colleges, societies and academies, libraries, research institutions, journals, museums and hospitals; (2) of the publication of some famous medical classics; (3) of the first performance of certain surgical operations and (4) of important discoveries in the field of medicine and allied

sciences. The usual procedure followed for the citation of famous personages according to dates is based on the birth day, although there is some inconsistency in this regard, the citation often occurring on the death day instead and in some cases on both birth and death days. Cross references of birth and death dates are made throughout the book. In those instances, when exact dates are unknown, the citations made are on arbitrary dates, as for example in the case of many medical saints and of such characters as Aesculapius, Avicenna, and Hippocrates. Only those with "completed careers" are included among the most recent of which are Harvey Cushing, Sigmund Freud, Hans Zinsser and Sir Frederick Grant Banting. A bibliography is appended, the book is fairly well indexed and there are 28 portraits.—*L. F. Edwards.*

17346. GERLITT, J. The development of quarantine.

Ciba Symposia 2(6): 566-580. 1940.—The founder of quarantine was Visconte Bernabo of Reggio, near Modena. In 1734 he promulgated a decree covering a 10-day period against the introduction and spreading of plague. A 30-day period was introduced by the municipal Council of Ragusa on the Dalmatian coast. A 40-day period of isolation was first required in 1838 by Marseille because of the danger of plague. The reason for the 40-day period according to Hecker was that during the 13th and 14th centuries the 40th day was generally regarded as the separation between the acute and chronic forms of disease. It was believed the embryo develops in 40-day periods, and women in childbed were observed for 40 days. Alchemists maintained that 40 days were necessary for certain transmutations. The Bible was also drawn upon to endow the number 40 with a special significance: the flood lasted 40 days, and other biblical events also occurred in 40-day periods. Members of wealthy families and members of universities used flight from infected areas as a protective measure. In 1720 Geneva members of the Great Council kept watch at the city gates day and night to subject incomers to careful examination. Soldiers were placed on the Rhône to prevent the spreading of infection by travelers or commercial traffic. Italy protected herself by quarantine of all foreign ships. Doctors wore clothing of leather with grotesque head covering. Long iron tongs were used to grasp suspected objects. Military cordons were used in the 18th century in Prussia, Greece, Paris and St. Petersburg. The modern system of internationally organized quarantine dates from 1851. At the Convention of Paris 12 nations decided upon common protective measures against introduction of plague, cholera, and yellow fever. 11 further conferences in various cities led to a regulation of the quarantine of the Suez Canal, particularly with respect to pilgrimages to Mecca. In 1907 at Rome it was decided to create an international bureau of public hygiene; and in 1920 a "Convention sanitaire internationale en vue d'arrêter les mesures propres à sauvegarder la santé publique contre l'invasion et la fièvre jaune" was adopted. Mutual reports on the occurrence of the first case of diseases in a particular area; reports as to the precautionary measures taken; obligation to make sure that a ship was not infected when leaving port; and publication of corresponding arrangements. Land quarantines are not to be established. Nevertheless, every government remains free to undertake a partial closure of its frontiers. Supervision of railway traffic is also permissible. Precise regulations exist for the extermination of rats, which was demanded for the first time at Venice in 1897. It must be carried out at least once every 6 months. Large seaports are required to have a trained personnel and the necessary equipment for this purpose. These regulations also cover docks and warehouses. Some uniformity has been achieved in quarantine, in that the signatory powers require arriving ships to fly the yellow quarantine flag until released by the quarantine officers of the port. The general directions for these operations are contained in the protocol of the Internat. Sanitary Convention of Paris, the detailed instructions in the "Annuaire sanitaire maritime international." The Paris Convention was ratified by 34 states in July, 1933. In accordance with general purpose of the arrangements they were also extended to cover air traffic. The internat. information service functions in the following manner: A signatory state reports the appearance of epidemic disease to the Paris office; the latter informs the diplomatic representatives in Paris, as well as the chief health authorities in the various countries. The Internat. Health Office in Paris has the power to request information from any one of the member countries with respect to the diseases named in agreement. Governments of member countries inform the Paris office at least once a year regarding the organization of health service in their ports.—*Victoria Carlsson.*

17347. KIBRE, PEARL. Cristoforo Barzizza, professor of medicine at Padua. *Bull. History Med.* 11(4): 389-398. 1942.—Cristoforo Barzizza, nephew of Gasparino Barzizza, humanist and grammarian, was one of a circle of distinguished physicians and professors at the Univ. of Padua in the first half of the 15th century (1415-1444). The *Introductorium*, his chief medical treatise, which was based

largely on Avicenna, demonstrates Cristoforo's interest in the standard medieval medical theories and practices. The work was intended for prospective practitioners. Besides a preface, which reveals the fact that there was a continuous tradition for the study and teaching of Avicenna, the work comprises a section on the body's physiol. constituents concerned with the maintenance of health, a section on things contrary to nature, or diseases. Cristoforo also wrote a commentary on the 9th book of Rasis' *Liber Almansoris* and 2 tracts on fevers.—*Sister M. E. Keenan.*

17348. LANGDON-BROWN, WALTER. From witchcraft to chemotherapy. 80p. Cambridge University Press: New York, 1941. Pr. \$60.—Fertility cults of primitive man gave rise to the medicine man. The practices of the medicine man were magic of three kinds: sympathetic magic; contagious magic, which gave rise to the use of plasters and like treatments; incantations to the gods, which in turn gave rise to hypnosis. The use of magic cures was prevalent for so long by so many peoples that it is not surprising to find it existing today in various forms among the most civilized of peoples. Fertility cults gave rise by various steps to witchcraft. Witches were feared, and their cures of magic were used by some and feared by most. Witchcraft and magic cures gave way to folklore and old wives' tales, and this in turn to herbal remedies. Herbal remedies served as a basis for the later more scientific therapeutics. Experimentation and chemical research produced the chemotherapy of our modern medicine. This rapid advance of modern therapeutics is the basis of hope for the health of the future.—*E. M. Fisher.*

17349. MOULTON, FOREST RAY. (edited by.) Liebig and after Liebig. A century of progress in agricultural chemistry. [viii]+111p. Frontispiece, illus. American Association for the Advancement of Science: Washington, 1942. Pr. \$3.—The book consists of a collection of ten papers presented on the 100th anniversary of the publication of "Organic Chemistry in its Application to Agriculture and Physiology" by Justus von Liebig in 1840. The following papers are included: Justus von Liebig—man and teacher, by C. A. BROWNE; Liebig's Influence in the Promotion of Agricultural Chemical Research, by H. R. KRAYBILL; Liebig and the Chemistry of Proteins, by H. B. VICKERY; Liebig and the Chemistry of Enzymes and Fermentation, by A. K. BALLS; Liebig and the Chemistry of Animal Nutrition, by P. E. HOWE; Liebig and the Chemistry of the soil, by R. BRADFIELD; Liebig—the humus theory and the rôle of humus in plant nutrition, by S. A. WAKSMAN; Liebig and the chemistry of mineral fertilizers, by H. A. CURTIS; Liebig and the law of the minimum, by C. A. BROWNE; and Liebig and the mineral requirements of plants as indicated by means of solution cultures, by B. E. LIVINGSTON. From the vantage point of present day knowledge, each essayist has briefly traced the development of his treated field, emphasizing particularly the influence which Liebig exercised on its development. The essays are well written, and make pleasant and informative reading in historical chemistry.—*E. E. Snell.*

BIBLIOGRAPHY

17350. BOLETIM do INSTITUTO de EXPERIMENTAÇÃO AGRÍCOLA. Number 1, 1941. 52 pages. Publ. by the Ministério da Agricultura, Centro Nacional de Ensino e Pesquisas Agronômicas, Rio de Janeiro.—The Instituto de Experimentação Agrícola comprises a network of experimental stations, situated in various parts of Brazil. The bulletin series will consist of research papers from these. The following paper comprises the first bulletin: *Ensaio de Adubação de Fumo na Baía* by CARLOS BARBOSA and G. J. FISCHER.

17351. DRABKIN, MIRIAM. (Johns Hopkins Inst.) A select bibliography of Greek and Roman medicine. *Bull. History Med.* 11(4): 399-408. 1942.—This list not only indicates the available works on Greek and Roman medicine, but aids the reader in selecting good editions of ancient medical writers. English translations have been listed and when no English translation exists, French and German versions. General works on the history of medicine and medical journals have not been included. The medical

rather than the philological viewpoint determined the selection of books.—*Sister M. E. Keenan.*

17352. DRABKIN, MIRIAM. (*Johns Hopkins Inst.*) Select pages from medieval medical manuscripts. *Bull. History Med.* 11(4): 409-436. 12 fig. 1942.—12 facsimiles of important medical manuscript pages in each of the Latin scripts in which medical works are most likely to be found are assembled here. A transcription, a general description of the script, and a list of special characteristics to help read the page and to identify and read other works in the script, accompanies each facsimile. A list of weights and measures, which was reprinted and translated from Henry E. Sigerist, "Masse und Gewichte in den medizinischen Texten des frühen Mittelalters," in *Kylos* III (1930), is appended.—*Sister M. E. Keenan.*

17353. RAFINESQUE, C. S. *Autikon Botanikon*, or botanical illustrations of 2,500 new, rare or beautiful trees, shrubs, plants, vines, lilies, grasses, &c. of all regions, but chiefly North America, with descriptions &c., and 2,500 self figures or specimens. 200p. Philadelphia, 1840. Modern lithoprint facsimile reproduction 1942 (Arnold Arboretum, Jamaica Plain, Mass.).—One of the very rare botanical items nomenclaturally appertaining to all parts of the world. The very numerous new genera were not listed in *Index Kewensis* until its Suppl. 7 appeared in 1929; and a hundred years after the book was published several hundred new binomials still remain to be listed in *Index Kewensis*. While many of the references appertain to the flora of the eastern and southern United States, others apply to the west, and still others to the floras of Mexico, the West Indies, South America, Europe, India, Asia Minor, Siberia, China, Japan, Malaysia, Africa, and Australia.—*E. D. Merrill.*

17354. STANFORD MEDICAL BULLETIN. Volume 1, Number 1, May, 1942. Editorial Board: ERNEST W. PAGE, M. L. TAINTER, CHARLES MARPLE, and C. E. SMITH. Advertising Representative: DUNCAN A. SCOTT. Quarterly. 28 pages, 4 articles. Published by the Board of Governors of the Stanford Medical Alumni Association, Stanford University, California. Subscription price \$2.—The Stanford Medical Bulletin plans to publish original contributions of historical, scientific, and particularly clinical interest. It has been reconstructed to permit further growth and development of the Bulletin in the direction of playing a more important rôle as an organ of expression for the whole Stanford medical family. The following papers comprise this issue: Nutrition problems of importance to the practicing doctor by ARTHUR L. BLOOMFIELD; The medical aspects of war gasses and chemicals: A summary by M. L. TAINTER; The Stillman-Rixford era of the department of surgery by ARTHUR L. FISHER; and The organization of a cancer hospital in Bombay by ROY B. COHN.

BIOGRAPHY

17355. HUME, EDGAR ERSKINE. Ornithologists of the United States Army Medical Corps. *Publ. Inst. Hist. Med.*

Johns Hopkins Univ. First Ser.: Monogr. [With a foreword by ALEXANDER WETMORE.] 1: xxv + 583p. Frontispiece, 109 fig. 1942. Pr. \$5.—Thirty-six biographic sketches of ornithologists in the U. S. Army Med. Corps compiled chiefly from unpublished material. The sketches present data pertaining to their lives and activities both as officers of the Medical Corps and as ornithologists. The sketches include extracts of each man's writings, photographs of the men, often at different periods in their careers, and lists of birds named in their honor or named by them. Each sketch is concluded by a list of principal biographic sources. A biographical table, a list of ornithologists in the U. S. Army Med. Dept. during the first World War, and a detailed index are to be found at the end of the book. The ornithologists whose biographic sketches are given are as follows: William Wallace Anderson, Charles Emil Bendire, James Graham Cooper, Elliott Coues, Samuel Wylie Crawford, Basil Hicks Dutcher, Samuel Moore Finley, Andrew Jackson Foard, Leon Lloyd Gardner, James Denver Glennan, John Lewis Heermann, Thomas Charlton Henry, Bernard John Fox Hammond, William Alexander Hammond, Adolphus Dowling Irwin, Caleb Burwell Rowan Kennerly, Edward Kershner, Jerome Henry Kidder, William Shakespeare King, Edgar Alexander Mearns, James Cushing Merrill, Edward Lyman Munson, DeWitt Clinton Peters, Richard Potts, Daniel Webster Prentiss, Robert Wilson Shufeldt, George Miller Sternberg, George Suckley, Ebenezer Swift, Edward Perry Volland, Timothy Erastus Wilcox, Casey Albert Wood, Leonard Wood, Samuel Washington Woodhouse, John Xantus, Henry Crecy Yarrow.—*O. S. Pettingill, Jr.*

17356. MACDERMOT, H. E. Maude Abbott: A memoir. xi + 264p. Frontispiece, 6 pl. Macmillan Co. of Canada, Ltd.: Toronto, 1941. Pr. \$2.50.—This book covers the life of Maude Abbott from her early childhood until her death. Because her early education was gained at a time when the struggle for high school and college education for women was just beginning in the conservative province of Quebec, and when medical education for women was in its infancy in Canada, the history of Maude Abbott's education is closely bound up in the larger issues, sidelights of which are glimpsed in the pages of this work. Her connection with McGill occurred in the early days of that great Medical School, and her story is one with that of the birth and growth of the Internat. Assoc. of Medical Museums, and of its famous number, the Osler Memorial Bulletin. The author sees the idiosyncrasies as well as the virtues of his subject, and, one feels, speaks sympathetically of the trials of editors of systems of medicine, or of monographs, to which she was a contributor, in extracting from her manuscript months, even years, after its promised date of delivery. Associated as she was in some manner or other with great persons in medicine, such as Adami and Osler, her story contains interesting bits of information on these men. The book is interestingly written, and is a very fitting tribute to a figure worthy of commemoration not only in the field of Canadian but also of international medicine.—*M. T. Macklin.*

EVOLUTION

ALFRED EMERSON, *Editor*

(See also Entries Degeneration, 17365; Cytotax in Melandrium, 17366; Evolution in Orthoptera, 17377; Ground squirrel, 17390; Sex-ratio in Hymenoptera, 17477; Evolution of root system of plants, 17510; Population spread of Hungarian Partridge in U. S., 17544; Species-stability in bacteria, 18455; Biochem. adaptation in yeast, 18684; Speciation and tetraploidy in Agropyron, 18806; Mass collections in Linaria, 18814; Speciation in oaks, 18818; Genetic effects of photoperiod and temp., 19026; Spruce sawfly, 19149; Hemiptera of Oceania, 19284; Malayan butterflies, 19304)

17357. EICHHORN, H. L. The growth-reproduction cycle: II. Growth 5(4): 351-358. 1941.—A concept of the growth-reproduction cycle may be reached by beginning with a corollary to "natural selection." If the fittest (including the more efficient individuals in a given environment) survive and the less fit (less efficient) are supplanted, it follows that a pattern of highest efficiency is approached as a mathematical limit. There are therefore 2 life patterns to consider; the current pattern, witnessed through observation and measurement, and the limiting pattern, found by solu-

tion. The former is a variable approaching the latter, which is fixed and constant. When evolution is sufficiently advanced, the margin between these patterns may become slight. This appears especially true with regard to the functions of growth and reproduction. In a previous paper, some of the paths of the growth-reproduction pattern were described. The expression for growth in the limiting pattern was developed; this expression had the characteristic form (sigmoid) and the precise proportions of growth curves observed in the current pattern. The present paper discusses

the movement to ultimate maintenance level. The expression for rate of movement is applied to show how basic life functions are timed. Path junctures are shown to correspond to periods of change. Results are briefly compared with some general current observations.—H. L. Eichhorn.

17358. WILHELM, RAYMOND W. (U. Missouri.) The application of the precipitin technique to theories concerning the origin of vertebrates. *Biol. Bull.* 82(2): 179-189. 1942.—The precipitin reaction was applied to distantly related groups among the invertebrates and chordates to test the various theories concerning the origin of vertebrates. The spp. employed in the study were: Echinodermata—*Asterias forbesi*, *Arbacia punctulata*, *Echinorachnius parma*, *Leptosynapta inhaerens*, *Thyone briareus*; Annelida—*Arenella opalina*, *Chaetopterus pergamentaceus*, *Cirratulus grandis*, *Glycera dibranciata*, *Phascolosoma gouldi*; Arthropoda—*Limulus polyphemus*; Chordata—*Dolichoglossus kowalevskyi*, *Amaroucium constellatum*, *Molgula manhat-*

tensis, *Styela partita*. Consistent results, confirmed by reciprocal tests, were obtained by injn. of saline solns. (buffered to pH 7.3) containing 500 mg. of lyophilized antigenic material from which the lipids had been removed. With 3 exceptions, the titer of homologous reactions was 1:1,024,000 \pm 1 dilution tube, and heterologous titers never exceeded homologous ones. Titers of cross-reactions between members of the various invertebrate phyla and the Prochordata were, in general, much higher in the case of echinoderm-prochordate reactions (e.g. 1:4000, 1:8000) than in annelid-prochordate (highest, 1:400) or arthropod-prochordate (highest, 1:400) tests. The titers of reactions between annelid and arthropod materials were of the same order of magnitude as those between echinoderm and prochordate materials. Serologically, as well as morphologically and developmentally, the chordates are more closely related to the echinoderms than to any other group of invertebrates tested, indicating that chordates evolved from animals which also gave rise to present-day echinoderms.—R. W. Wilhelm.

CYTOLOGY

Editors: R. E. CLELAND, *Plant*; C. E. McCLUNG, *Animal*

(See also Entries 17578, 17649, 17761, 18340, 18806, 18820, 18832, 19149, 19216)

GENERAL

17359. BRANCH, CHARLES. (Boston U.) The mitotic activity of a group of cholinchicine-like compounds. *Federation Proc. Pt. II* 1(1): 175. 1942.—An abstract.

17360. FABERGÉ, A. C. (Univ. Coll., London, Eng.) Homologous chromosome pairing: The physical problem. *Jour. Genetics* 43(1/2): 121-144. 10 fig. 1942.—The physical aspects of the pairing of homologous chromosomes are considered, and a hypothesis to explain the phenomenon is developed on the basis of the Guyot-Bjerknes hydrodynamic effect—the mutual attraction of bodies pulsating in phase. The hypothesis appears capable of satisfying all conditions imposed by the known biol. data. The force is a long-range one, and there is no saturation effect when more than 2 bodies pulsating in phase with the same frequency are present. The physical consequences of the hypothesis are not impossibilities, provided that the unit of homology is rather larger than the usual estimate of gene size, and is about the size of the diam. of the leptotene chromosome.—H. B. Glass.

PLANT

17361. BARBER, H. N. (John Innes Hort. Inst., Merton, Eng.) Chromosome behavior in *Uvularia*. *Jour. Genetics* 42(1/2): 223-257. 2 pl., 35 fig. 1941.—In *U. perfoliata* mitoses the centromere is conspicuously bipolar in oriented though not in unoriented chromosomes. The 7 somatic pairs of chromosomes are distinguishable. In each of 3 observed cases of nonorientation of chromosomes in 200 metaphases, it was the E chromosome which was involved. This is evidence that centromeres may differ in their efficiency.—Temperature shocks during early meiotic prophase reduce the chiasma frequency. The reduction is greatest in the longer chromosomes and chromosome arms, chiasmata becoming localized in the short chromosomes and chromosome arms. The reduction in the long arms is greatest in the intermediate regions, chiasmata in these arms becoming localized distally and proximally, especially the latter. Reduction in chiasma frequency is deduced to be brought about by an interruption of pairing, which normally begins in the short arms and at both ends of the long arms. The localization of pairing depends on the proximity of chromosome regions, detd. by the persistence of telophase arrangements, and by a greater freedom of movement of short arms and the ends of long arms.—High temps. during meiosis lead to the formation of aneuploid and polyploid pollen. Deficient pollen grains die, but survive to the first pollen-grain mitosis whenever they remain attached to their complementary grain. In the latter case they remain synchronized and appear to cooperate.—H. B. Glass.

17362. EDWARDS, JOHN K. Cytological studies of toxicity in meristem cells of roots of *Ze a mays*. II. The effects of lithium chloride. *Proc. S. Dakota Acad. Sci.* 21:

65-67. 1941.—0.01 M LiCl is toxic to the meristem cells of corn root tips. Basic fixation with chromic sulfate and formaldehyde reveals little injury to the cytoplasm, however, even when the roots are exposed to 0.1 M LiCl for 24 hrs. With Bouin's fixative (acid) the cytoplasm is very granular and vacuolate following all solns. stronger than 0.02 M. 0.1 M. LiCl causes resting chromatin to clump with both acid and basic fixatives. Division figures are not seen following treatment with 0.1 and 0.02 M solns. After 0.01 M LiCl only prophases are present, while following 0.004 M and 0.002 M there are only distorted metaphases. Normal division figures are present after 0.001 M LiCl, but in some cases the plates are arranged diagonally or parallel with the long axis of the root.—Auth. summ.

17363. HANCOCK, B. L. (Oxford, Eng.) A schedule for chromosome counts in some plants with small chromosomes. *Stain Technol.* 17(2): 79-83. 2 fig. 1942.—A schedule is given which produced excellent results for somatic chromosome counts on some British species of *Galium*. These species present great difficulties owing to the small size of the chromosomes (ca. 1.5 μ long), the large somatic numbers (up to 96) and the slenderness of the root tips. Special features of the schedule, which is the result of much exper. with various technics, are: fixation with Bellings' Navashin type fixative, which was quite the best tried; the modification of Randolph's card mount meth. to overcome the difficulty of the small diam. of the root tips by mounting together several from the same plant, so that they can be, embedded and sectioned almost as easily as much larger root tips; staining with dilute (0.1%) crystal violet, the most critical stain used, after mordanting with 1% aqueous chromic acid to intensify the stain in the small chromosomes; and the addition of an extra stage of differentiation in absolute alcohol diluted with xylol to remove strands of stain, which are often left in the cytoplasm between the chromosomes, since clove oil, usually the last differentiating fluid used, differs from alcohol in removing crystal violet more rapidly from the chromosomes than from the cytoplasm. This schedule may prove valuable in chromosome counts of other plants where similar difficulties arise.—Auth. abst.

17364. JAMES, W. M., and F. T. ADDICOTT. Preliminary report on time of flower formation and chromosome numbers in *Nerine*. *Herbertia* 8:111-116. 1941.—A bulb of *N. bowdenii*, possessing a fully developed and flowering scape, when dissected showed both the remains of last year's flower stalk and a small inflorescence that would presumably produce the following season's flowers. Chromosome counts were made on aceto-carmine root-tip smears of several forms. Reported (2n) counts are *N. flexuosa* var. *alba*—22, *N. sarniensis* var. *coruscans major*—22, *N. bowdenii*—22 (—23?), *N. falcata*—22 (—23?), *N. curvifolia* var. *fothergilli major*—24, *N. filifolia*—24; and

among hybrid horticultural clones: Chameleon-22 (?), Manselli-24, Elegantissima-28, Mrs. George Barr-28, and Ingens 32 (-34?). Chromosome types varied between species. One chromosome of *N. bowdeni* possessed a large satellite. *N. falcata* has a pair of small V chromosomes with widely separated arms.—W. S. Flory, Jr.

17365. JONES, D. F. (*Connecticut Agric. Exp. Sta., Storrs.*) Chromosome degeneration in relation to growth and hybrid vigor. *Proc. Nation. Acad. Sci. U. S. A.* 28(2): 38-44. 1942.—The maintenance of homozygous inbred lines is a matter of serious concern for the practical breeder. The possibility of continued production of degenerative loci must be guarded against by progeny testing or valuable lines will be lost or so impaired in vigor that they can be used only with difficulty. For theoretical genetics it is worth while to note that there is the possibility of continued degeneration; this takes place in crossbred as well as in inbred families and has nothing to do with inbreeding but is more apparent after consanguineous mating and more quickly eliminated. The prevention of chromosome degeneration and the elimination of defective loci after they are formed, in organisms not exposed to the rigorous natural selection, is one of the major problems of the future.—Auth. abst.

17366. LÖVE, DORIS. A tetraploid dioecious *Melandrium* found in nature. *Hereditas* 28: 241-242. 1942.—Sex determination in the dioecious spp. of *Melandrium* has been investigated by Westergaard (1938, 1940), Warmke and Blakeslee (1939, 1941) and Ono (1939), who studied the sex mechanism of induced tetraploids. The sex determination was shown to be fundamentally different from that met with in *Drosophila* and *Rumex acetosa*, as the polyploid plants were dioecious but not intersexes, since sex is det. by strong ♂ elements in the Y chromosome. Westergaard also mentions that, theoretically, a tetraploid "race" of these spp. should be able to exist in nature with a normal sex ratio. Such a tetraploid "race" with $2n=48$ chromosomes has been detected in material of *M. rubrum* s. lat. from Sweden. According to herbarium studies the plants are identical with *M. crassifolium*, Fries.—Åskell Löve.

17367. RAMANUJAM, S. (*Imp. Agric. Res. Inst., New Delhi, India.*) Chromosome number of *Sesamum prostatum* Retz. *Current Sci.* 10(10): 439-440. 3 fig. 1941.—Smears of meiotic stages show $n=16$ for *S. prostatum*, $n=13$ for *S. orientale*. The Argentinian spp. *S. radiatum* is reported to have $n=32$. [Abstracter's note.—Correction to above. In figure 3, p.439 the chromosome numbers were printed incorrectly as 16 and 14 in the 2 anaphasic groups. The figure was later reproduced on p.505 (*Current Sci.* 10(11) with the correct 16 and 16 distribution.]—R. A. Muttikowski.

17368. SRINATH, K. V. (*Intermediate Coll., Bangalore, India.*) A probable case of translocation during mitosis involving the satellite thread. *Current Sci.* 11(2): 59. 5 fig. 1942.—*Muscari plumosum* ($2n=18$) has 1 pair of satellite chromosomes, of which one has tandem satellites. The presence of 3 satellites may be explained by assuming a translocation involving the 2 chromosomes with tandem satellites in the separating groups.—Auth. abst.

17369. VAARAMA, ANTERO. (*U. Helsinki.*) Observations concerning the meiotic and mitotic chromosomes in *Sagittaria sagittifolia* L. and *S. natans* Pall. *Ann. Bot. Soc. Zool. Bot. Fenniae Vanamo* 16(2): 1-28. 28 fig. 1941.—The chrom. number in *Sagittaria sagittifolia* and *S. natans* is $2n=22$. Morphologically the chromosome complements of the 2 *Sagittaria*-spp. were very similar to each other, and to *S. aginashi*, a Japanese spp. investigated by Shinke (1934). The number and form of the nucleoli vary considerably, especially in the root-tip meristem, as a result of the division and fusion of the nucleoli. The primary number of the nucleoli in the root-tip cells is 2. Accordingly, the deviation from the number of the SAT-chromosomes, of which one pair is found in a nucleus, is to be regarded as secondary. Meiosis is similar to that of *S. aginashi*. Major coiling is preserved unchanged during interkinesis and is still present in the homeotypic division, though the uncoiling begins during the latter division. A new spiralization becomes visible at zygote in those regions where the chromosomes are already conjugated. Major coiling develops rapidly during diplotene diakinesis. The minor

spiral is visible in interkinesis chromosomes and in some bridges arising between the poles in the heterotypic division. In mitotic chromosomes a new spiral is to be observed at prophase immediately after a distinct split has arisen in the chromosome thread. In somatic metaphase and telophase chromosomes, there is a spiral, the structure of which is optically single, but which is probably formed of 2 closely approximated chromatids. The mitotic spiral is apparently single-coiled, which would be contrary to Kuwada's (1939) spiralization theory.—From auth. summ.

ANIMAL

17370. HENKE, KARL, und INGEBORG MERTZ. Über die Kerngrößenunterschiede im Flügelepithel der Mehlmotte und ihre Beziehungen zur Größendifferenzierung der Schuppen. *Biol. Zentralbl.* 61(1/2): 40-64. 7 fig. 1941.—The changes in the variability curve of the nuclear diam. of the epithelial cells of the upper surface of the wings for 6 stages between 48-60 hrs. and 186-192 hrs. of the pupae of *Ephestis kuhniella* raised at 25°C show that at the beginning of scale development the epithelial nuclei and the majority of the nuclei of the follicle-forming cells are approx. of the same size. The whole course of the curves agrees well with the assumption that the 3 size-types of the scale-forming cells form a duplication series and are related to the 3 different scale types, the deep, middle and covering scales of the wing color pattern. The nuclei of the scale-forming cells begin to decrease toward the end of scale-formation. There are 2 types of follicle-forming cells as shown by the differences in size of their nuclei, which do not decrease in size.—A. H. Hersh.

17371. KODANI, M. (*U. California, Berkeley.*) The structure of the salivary chromosomes of *Drosophila melanogaster*. II. Effects of urea-alkali mixture and other chemicals on the structure of salivary gland chromosomes. *Jour. Heredity* 33(4): 115-133. 6 fig. 1942.—The salivary glands of *D. melanogaster* were treated with 50%, 30% and 10% solns. of urea-alkali mixture for varying lengths of time at room temp. The 3 types of transformations are due to different modes of migration of the nucleic acid from its peripheral position in the untreated chromosomes to the chromonemata. There are 4 chromonemata. The structure of the β_4 -chromosomes is considered to represent the structure of the normal chromosome. The different appearance of the coil and its nucleic acid bulbs at the free ends of the β_4 -chromosomes substantiates the "telomere" concept. A "skeleton" exists in the discs of normal chromosomes which is resistant to nucleases but is destroyed by urea-alkali treatment. The structure of the lampbrush chromosome produced by this treatment is compared with the structure of the natural lampbrush chromosomes of *Triton* and chick described by Koltzoff.—Auth. summ.

17372. McMILLION, THEODORE M. (*Geneva Coll., Beaver Falls, Pa.*) Spermatogenesis and chromosome complexes in the rabbit (*Lepus cuniculus*). *Bull. Pittsburgh Univ.* 38(2): 289-293. 1942.— $2n$ is 44. Rabbits of 7 to 8 weeks of age were found suitable for the study of spermatogonia and satisfactory amniotic and embryonic material was obtained from 18-day embryos. B_{15} soln. was found to give superior fixation. No evidence of chromosome fragmentation was found.—T. M. McMILLION.

17373. SELF, J. TEAGUE. The interphase in relation to modified mitosis in the embryonic cells of *Gambusia affinis affinis* (B & G). *Trans. Amer. Microsc. Soc.* 60(4): 530-535. 8 fig. 1941.—The cells resembling modified mitoses are not in the process of division. There is a general dispersal following the telophase in which there is an apparent fragmentation of the chromosomes. These fragments are held together by a matrix which sometimes resembles a spindle, but has nothing to do with cell division.—J. T. Self.

17374. SEVERINGHAUS, ANURA E. (*Columbia U.*) Sex chromosomes in a human intersex. *Amer. Jour. Anat.* 70(1): 73-90. 3 pl. 1942.—An individual, 38 yrs. of age, supposedly ♀, was discovered upon physical examination to be an intersex with secondary sex characters of both ♂ and ♀ types. Biopsy specimens were taken of subcutaneous glands lying in the region of the labia and shown to be testes. Excellent fixation with McClung's PAF15B20

permits a clear description of the early synaptic stages of the chromosomes and of tetrad formation. The X and Y components separate on the first maturation spindle and proceed to opposite poles. Oguma's contention that the entire complex is a tripartite X-chromosome which moves to one pole is, therefore, not confirmed. These may be related to the numerous abnormal primary spermatocytes and the scarcity of normal secondary spermatocytes and spermatids. Some mature sperm of normal appearance were seen. The possible relation between the atypical chromosomes of the gonad and the intersexual condition is discussed.—Auth. (courtesy *Wistar Bibl. Serv.*).

1735. SUOMALAINEN, ESKO. (U. Helsinki, Finland.) Beiträge zur zytologie der Parthenogenetischen insekten. II. *Lecanium hemisphaericum* (Coccidae). [With Eng. summ.] *Ann. Acad. Sci. Fennica Ser. A* 57(6): 1-30. 13 fig. 1940.—The diploid chromosome number of *Lecanium hemisphaericum* is 16. The eggs of the bisexual-parthenogenetic race pass through 2 maturation divisions. In those eggs, which develop parthenogenetically, the chromosome number is reestablished by automixis through the union of the second polar nucleus with the egg nucleus. In *Pseudococcus* and *Lecanium* the binucleate spermatids probably fuse in pairs; since the spermatid nuclei, which contain the condensed group of chromosomes, degenerate, only 2 spermatozoa are developed from the quadrinucleate spermatids thus formed. These coccids accordingly would resemble *Gossyparia* and *Phenacoccus* both in their cytology and sex determination.—From auth. Eng. summ.

1736. WHITE, M. J. D. (Univ. Coll., London.) The evolution of the sex chromosomes. I. The XO and X_1X_2Y mechanisms in praying mantids. *Jour. Genetics* 42(1/2): 143-172. 6 pl., 12 fig. 1941.—A survey of 11 spp. belonging to 10 genera and 5 subfamilies of the Mantoidea shows that the majority, like other Orthopterans, have an XO:XX sex-determining mechanism. The X is regularly mediocentric. In the subfamily Mantinae, genera *Paratenodera*, *Tenodera* and *Sphodromantis*, an $X_1X_2Y:X_1X_2X_2$ mechanism has evolved, probably by mutual translocation between the original sex chromosomes and a pair of autosomes. The diploid chromosome numbers vary from 15 to 29. Three X_1X_2Y spp. have 27; *S. viridis* has only 23. Meiosis in all species was found to be anomalous, as no chiasmata were apparent. Nondisjunction of the sex chromosomes varied from 2.51% to 6.24% in the X_1X_2Y

forms. Unequal bivalents, due to a centric shift or a pericentric inversion in one member of a chromosome pair, were found in *Tenodera* and *Paratenodera*.—H. B. Glass.

1737. WHITE, M. J. D. (Univ. Coll., London.) The evolution of the sex chromosomes. II. The X-chromosome in the Tettigonidae and Acrididae and the principle of "evolutionary isolation" of the X. *Jour. Genetics* 42(1/2): 173-190. 12 fig. 1941.—Data available for 23 species of the Tettigonidae show that the X chromosome is telocentric in some species, mediocentric in others, but that the changes are due solely to internal rearrangements, not to structural changes involving the X and an autosome. The X is consequently in a state of "evolutionary isolation" from the autosomes. This conclusion is based on (1) the fact that measurements of the ratio "length of X/sum of autosomal lengths" in related species with variable types of X do not suggest that autosomal material has been transferred to the X in those forms with a mediocentric X; (2) the total heteropycnotosis of X's and the failure of autosomal heterochromatic regions to show the reversal of heteropycnotosis characteristic of the X; (3) the lack in all spp. of a "neo-Y" chromosome such as would be expected to arise after an X-autosome translocation. The same conclusions apply to the Acrididae (13 spp.) and Mantoidea (4 spp.), excepting for the few XY and X_1X_2Y spp. in which "whole arm transfers" to the X have occurred. In those subfamilies of Tettigonidae and Mantoidea with a wide interspecific variation in length of the X, duplications and deficiencies of positive selective value must have arisen, perhaps because they readjusted the genic balance of sex determination to some more advantageous equilibrium.—H. B. Glass.

1738. WIGGLESWORTH, V. B. The significance of "chromatic droplets" in the growth of insects. *Quart. Jour. Microsc. Sci.* 83(2): 141-152. 3 fig. 1942.—From a review of the literature, and from observations on *Rhodnius prolixus*, it is concluded that the "chromatic droplets" which appear in the epidermis during the moulting and metamorphosis of insects are formed from the dissolution of entire nuclei; nuclei that have become superfluous, either because they belong to specialized larval structures that are being discarded, or because the exuberance of cell division has led to their production in greater numbers than are needed.—V. B. Wigglesworth.

GENETICS

Editors: ORLAND E. WHITE, *Plant*; SEWALL WRIGHT, *Animal*

(See also Entries 17359, 17360, 17361, 17377, 17440, 17444, 17907, 18278, 18357, 18377, 18380, 18394, 18400, 18432, 18434, 18496, 18806, 18820, 18841, 18860, 18864, 18870, 18935, 18936, 18937, 19014, 19021, 19026, 19105, 19130, 19149)

GENERAL

17379. DARLINGTON, C. D. (John Innes Inst., Merton, London.) Chromosome chemistry and gene action. *Nature [London]* 149(3768): 66-69. 1942.—An extensive discussion, chiefly in terms of 24 works, 9 of which are the author's.—E. D. Crabb.

17380. HALDANE, J. B. S. (U. London.) New paths in genetics. 206p. Harper and Brothers: New York, 1942. Pr. \$2.50.—A series of lectures dealing with the newer relations of genetics to other sciences, addressed to students of medicine, embryology, and biochemistry as well as to geneticists. The treatment is illustrative rather than comprehensive. In Chap. I the applications of genetics to biochemistry, individual psychology, agriculture, medicine and politics are illustrated. In Chap. II, genetics and biochemistry meet in studies of human metabolism and of plant pigments. In Chap. III, studies of the development of dwarf, brachyuric, and cancerous mice, of henny feathered breeds of poultry, and of anemic rats illustrate the cooperation of geneticists and embryologists. In Chaps. IV and V, inherited human abnormalities are considered, with warnings against the one-sided interpretations of certain eugenists and environmentalists. Cases with irregular manifestation are emphasized, and the effectiveness of negative eugenic measures is estimated for various types of traits. Mutation rates of certain human genes are given and their

equilibrium frequencies in populations are considered. Methods of studying the formal genetics of man by statistical analysis and some preliminary results of their application in the analysis of linkage values for the sex chromosome are described.—H. B. Glass.

PLANT

17381. HAYES, HERBERT KENDALL, and FORREST RHINEHART IMMER. (U. Minnesota.) Methods of plant breeding. xii+432p. 28 fig. McGraw-Hill Book Co., Inc.: New York, 1942. Pr. \$4.—Plant breeding methods and principles are discussed from a practical as well as a theoretical viewpoint. Examples are given, and the steps involved in general practice, as well as in the breeding of particular crops, are outlined. Breeding for disease and insect resistance is discussed thoroughly. Chapters on genetics and cytogenetics in relation to breeding, the rôle of plant breeding, mode of reproduction in relation to breeding methods, technics in selfing and crossing, pure-line method of breeding naturally self-pollinated plants, hybridization as a method of improving self-pollinated plants, the back-cross method of plant breeding, controlled pollination methods of breeding cross-pollinated plants, seed production, field plot technic, correlation and regression in relation to plant breeding, and 2 chapters devoted to special mathematical methods involving yield tests and

variety comparisons, illustrate general principles. Chapters are devoted to the genetics and breeding of wheat, oats, corn, barley, and flax. There is a glossary, an ample bibliography and an appendix of statistical tables from Fisher and others.—O. E. White.

17382. MYLER, JAMES L., and E. H. STANFORD. (*Agric. Exp. Sta., Davis, Calif.*) Color inheritance in barley. *Jour. Amer. Soc. Agron.* 34(5): 427-436. 1942.—The 2 purple pericarp barleys. Black Hull-less and C.I. No. 5628, have the same factor for purple (*Pp*) which is linked with non-6-rowed vs. 6-rowed (*Vv*) with 13.19% crossing over. The factor *Pp* is thus in group I. Two complementary factors for blue aleurone were reported. One of these factors, previously studied by Robertson, et al. and Buckley and designated as *Blbl*, is linked with the hooded vs. awned character (*Kk*). The value $24.72 \pm 1.73\%$ crossing over does not differ significantly from Robertson's value of $22.58 \pm 0.82\%$ crossing over. This factor has been placed in linkage group IV. A 2d factor for blue, which will be designated *Blbl*, is linked with the hulled vs. naked character (*Nn*) which places it in linkage group III. The crossover value for this linkage is $9.88 \pm 0.44\%$. The factor for white vs. orange lemma (*Oo*) is inherited independently of factors representing linkage groups I, III, IV, and V.—Auth. summ.

17383. PATCH, L. H., J. R. HOLBERT, and R. T. EVERLY. Strains of field corn resistant to the survival of the European corn borer. *U. S. Dept. Agric. Tech. Bull.* 823, 1-21. 1942.—Open-pollinated vars. and inbreds and hybrid strains of field corn were tested for their resistance to the survival of the European corn borer (*Pyrausta nubilalis*) by infesting the plants by hand with eggs produced in the laboratory. After allowing for the differences in maturity of the strains as measured by silking date, relatively low levels of mature borers were obtained during a 10-yr. period from resistant strains and high levels from susceptible strains. The partially resistant strains had intermediate borer levels. Open-pollinated vars. averaged 25% more than the predicted mean numbers of borers in strains silking on the same dates. Inbreds Ill. R4., Ia. L317, Wis. CC5, Mich. 77, and Mich. 106 averaged 32% less than the predicted numbers of borers; inbreds Ill. Hy., Ind. TR, U. S. 540, Ia. 1205, Wis. CCI, Ill. A48, and Ill. L averaged 8% less than the predicted numbers of borers; and inbreds Ill. A, Ill. 90, Ind. WF9, and U. S. 187-2 averaged 33% more than the predicted numbers of borers. Single-cross hybrids involving 2 resistant inbreds averaged 39% less than the predicted numbers of borers. Hybrids involving 2 susceptible inbreds averaged 58% more than the predicted numbers of borers. Hybrids involving different combinations of resistant, partially resistant, and susceptible inbreds, and hybrids involving 2 partially resistant inbreds contained populations of borers between these 2 extremes. The cumulative effect of an undetermined number of multiple factors in inbred lines in producing borer-resistance in hybrids is indicated. A comparison of sister inbred lines, separated at the 2d to the 5th generation of inbreeding, showed that the difference between sisters of pairs of sisters in transmitting borer resistance to hybrids averaged not much larger than the difference found between the members of pairs of samples of the same strains, indicating little advantage in testing sister strains.—L. H. Patch.

17384. REED, GEORGE M. (*Brooklyn Bot. Gard., Brooklyn, N. Y.*) Inheritance of smut resistance in hybrids of Navarro oats. *Amer. Jour. Bot.* 29(4): 308-314. 1942.—The Navarro oat var. is resistant to all the known races of *Ustilago avenae* and *U. levis* with which tests have been made. Hybrids of Navarro and Hull-less inoculated with *U. avenae* race 1, based on *F*₂ and *F*₃ data, indicate a 2-factor relation for inheritance of resistance, and a 3-factor difference is indicated for these hybrids when inoculated with *U. levis* race 1 and race 7. When inoculated with *U. avenae* race 12, markedly different results are obtained. There is a high % of inoculated *F*₂ plants infected and in the *F*₃ there is a small number of resistant progenies and a great excess of segregating and susceptible. The Hull-less var. is susceptible to all of these races. In hybrids of Navarro and Black Mesdag, 5 factors for inheritance of resistance to *U. levis* races 7 and 9, and 3 factors to *U. avenae* race 12 are indicated. Black Mesdag is susceptible to both races of covered smut and resistant to the loose

smut. In the hybrid and Navarro and Gothland, inoculated with race 1 of the loose smut, 2 factors are indicated, Gothland being susceptible to this race. Although all of the parental vars. are resistant to the Red Rustproof race of loose smut, an occasional *F*₃ progeny of Navarro X Hull-less and Navarro X Gothland contains infected plants, no smutted plants being found in the *F*₃ progenies of Navarro X Black Mesdag.—G. M. Reed.

17385. SHIFFRIS, OVID. (*Cornell U., Ithaca.*) Polyploids in the genus *Cucumis*. Preliminary account. *Jour. Heredity* 33(4): 144-152, 5 fig. 1942.—Several *4n* varieties of cucumbers (*C. sativus*, *2n*=14) and melons (*C. melo*, *2n*=24) were produced by colchicine treatment and studied for 3-5 generations. In generations 2 and 3 maternal diploids and typical mutants were recovered. The dimensional change in fruit shape brought about by polyploidy depends apparently on the initial genic patterns involved, the level of chromosome multiplication and, in some cases, on the physiological reaction of the tetraploid plants. The *4n* fruits may be larger or smaller than the diploid. Other morphological changes are discussed also. The *4n* cucumbers have a reduced zone of ecological adaptation and only under favorable conditions do they attain or exceed the size of the corresponding diploid plants. Sterility as a character is accentuated in the cucumber by chromosome doubling due primarily to the physiological reaction of the tetraploids and the initial increase of pollen and egg abortion. Variability in fertility of individual *4n* cucumbers greatly exceeds that of the *2n*. Spontaneous tetraploids appear in the cultivated cucumber, but a natural *4n* population can hardly exist under present environmental conditions.—Auth. summ.

17386. STRINGFIELD, G. H., and D. H. BOWMAN. (*Agric. Exp. Sta., Wooster, Ohio.*) Breeding corn hybrids for smut resistance. *Jour. Amer. Soc. Agron.* 34(5): 486-494. 1942.—Smut counts made in 48 corn-performance expts. showed that about $\frac{1}{4}$ of the hybrid entries carried less smut infection than did the open-pollinated vars. in the same expts. 12 inbred lines appear to be more or less resistant to corn smut. Hybrids in which half or more of the parentage consisted of these resistant inbred lines showed $< \frac{1}{4}$ as much smut as did the open-pollinated vars. Hybrids have been developed that combine a high degree of smut resistance with other desirable agronomic characters. Such hybrids are being grown extensively. The use of these and similar hybrids in other states constitutes the first significant advance in the control of corn smut.—Auth. summ.

17387. SWENSON, S. P. (*S. Dakota Agric. Exp. Sta., Brookings.*) Inheritance of seed color in biennial white sweet clover, *Melilotus alba*. *Jour. Amer. Soc. Agron.* 34(5): 452-459. 1942.—A cross between a green-seeded dwarf and a pale yellow-seeded normal plant gave *F*₁ plants with seeds segregating 3 yellow:1 pale green and of intermediate growth habit. Four seed colors occurred in *F*₂: normal yellow (yellow seed coats and yellow cotyledons); pale yellow (colorless seed coats and yellow cotyledons); pale green (yellow seed coats and green cotyledons); and green (green or colorless seed coats and green cotyledons). The 4 colors were attributed to various combinations of alleles of 2 gene pairs, *C* *c* and *Y* *y*, found to be independently inherited. *C* is necessary for color production in the seed coat and *Y* and *y* produce yellow and green cotyledons, respectively, regardless of seed coat color; however, in the presence of *C*, yellow or green color also develops in the seed coat. Green-seeded *c* *y* plants were easily distinguished from green-seeded *C* *y* plants by examining seeds from unprotected racemes, pollinated naturally by stray *Y* pollen. The seeds thus obtained were pale yellow and pale green, respectively, the latter being a 2d type of pale green not recovered in *F*₂ studies. Normal, intermediate, and dwarf growth habits were differentiated by one gene pair, found to be independent of the 2 gene pairs for seed color. Some evidence obtained as a result of a severe root rot infestation indicated an association between dwarf growth habit and susceptibility to root rot but the data were considered inconclusive.—S. P. Swenson.

ANIMAL (EXCEPT MAN)

17388. CHASE, HERMAN B. (*U. Illinois.*) Studies on an anophthalmic strain of mice. III. Results of crosses

with other strains. *Genetics* 27(3): 339-348. 1942.—The inbred strain of anophthalmic mice consistently produces offspring of which about 88.3% by birth records are eyeless, and the remainder have greatly reduced eyes, usually asymmetrical, with the left eye tending to be larger than the right. A correlation with age of mother of -0.06 indicated that the older the mother the greater the tendency toward complete eyelessness. When crossed with 4 other strains this eyelessness proved to be recessive and due to 1 major factor termed *ey*. In addition to non-hereditary variations as seen in the anophthalmic strain, the 4 strains differed considerably in the minor hereditary factors involved in the expression of this character.—H. B. Chase.

17389. COLE, RANDALL K. (Cornell U.) The "talpid lethal" in the domestic fowl. *Jour. Heredity* 33(3): 83-86. 2 fig. 1942.—The talpid lethal is a simple autosomal recessive character which exerts its lethal effect usually by the 8th to 10th day of incubation. The lethal embryos are characterized by a variety of anatomical abnormalities, of which the duplication of the digits, shortening of the spinal column and the proximal bones of the appendages, and severe ectopia are the more prominent. The lethal gene is known to have been present in the departmental flock for at least 8 yrs. previous to its recognition. The gene *ta* for the lethal character probably does not belong in the "Cp R U," "D M," nor "F I Cr" linkage groups.—R. K. Cole.

17390. FICHTER, EDSON, and LLOYD DON DAVIS. (U. Nebraska.) A pale variation in a ground squirrel. Notes on a pale individual of the thirteen-striped ground squirrel *Citellus tridecemlineatus tridecemlineatus* (Mitchill). *Jour. Heredity* 33(4): 153-155. 1 fig. 1942.—In the hairs from the pale individual the dark pigment generally is less concentrated in both the banded and entirely dark hairs than in those of the dark litter mates. In the variegated hairs the dark band is shorter also. A dark guard hair of a typical colored individual appears almost black by reflected light; that of the pale squirrel is smoky brown. The pale individual is more tractable than darker colored litter mates.—L. M. Dickerson.

17391. GREEN, M. M., and C. P. OLIVER. Increased fertility in *Drosophila* in the heterozygote of two allelomorphs each homozygous infertile. *Proc. Minnesota Acad. Sci.* 9: 62-64. 1941.—In a study of lozenge alleles of *D. melanogaster*, ♀♀ homozygous non-lozenge (*lz⁺*), spectacle (*lz^s*), and glossy (*lz^g*), and the compound *lz^s/lz^g* were mated to *lz^g* ♂♂. Only spectacle ♀♀ were significantly less viable than *lz⁺*. Of the viable ♀♀, 92, 48.5, 33, 22%, respectively, of the *lz⁺*, *lz^s/lz^g*, *lz^s/lz^s*, and *lz^g/lz^g* produced offspring; and the av. number of offspring per fertile ♀ was, respectively, 62.4, 26.3, 14.5, and 9.3. Part of the decreased fertility is explained by the absence of spermathecae and pars ovariae in the *lz^s/lz^s*, *lz^g/lz^g*, and the *lz^s/lz^g* ♀♀, although the tubular receptacle seems to be normal. However, the significantly higher fertility of the compound ♀♀ indicates that other factors affect the fertility.—Authors.

17392. HOLLANDER, W. F. (Palmetto Pigeon Plantation, Sumter, S. C.) Auto-sexing in the domestic pigeon. *Jour. Heredity* 33(4): 135-140. 1 fig. 1942.—A striking difference in coloration exists between the homozygous and the heterozygous or hemizygous (♀) conditions of a sex-linked dominant mutant, "Faded." Therefore pure-bred strains of pigeons with this factor show permanent sex dimorphism. The sexes can be distinguished from the 1st day after hatching, the ♂♂ having rather short nestling down and absence of beak pigment, and the ♀♀ having normal down and dark beak pigment. The definitive plumage of the ♂ is dusty white; that of the ♀ is dark. Auto-sexing is also possible with "Almond," a dominant allele of "Faded," but the sex difference is less marked and useful.—W. F. Hollander.

17393. ROBERTSON, G. GORDON. (Yale U.) An analysis of the development of homozygous yellow mouse embryos. *Jour. Exp. Zool.* 89(2): 197-229. 2 pl. 1942.—Homozygous yellow mouse embryos, appearing in the mendelian ratio of one homozygous yellow to 3 normal, develop normally through cleavage and blastodermic vesicle formation. Death occurs approx. at the time when the blastocyst comes in contact with the uterine epithelium. Just after

normal embryos have begun to implant the homozygous yellow embryo appears as a small mass of vacuolated cells in a decidual crypt in which the uterine epithelium has not disappeared, although the uterus is in the pregestational phase. Disintegration and resorption are completed within 36 hrs. The successful transplantation of ovaries from heterozygous yellow mice to homozygous agouti mice has made possible the study of the effects of a new uterine environment upon the development of homozygous yellow mouse embryos. In the agouti uterus these embryos develop further than in the heterozygous yellow uterus. This is indicated by the presence of twice the number of cells, by the decidual disintegration associated with a more advanced development of the implantation site. The development of the homozygous yellow embryo is influenced by uterine as well as by chromosomal factors.—Auth. (courtesy Wistar Bibl. Serv.).

17394. WOLFF, DOROTHY. (Washington U.) Three generations of deaf white cats. *Jour. Heredity* 33(2): 39-43. 1 fig. 1942.—Hereditary deafness occurs frequently in albino cats and in cats with blue eyes. The deaf cats are timid animals and do not mew audibly. Microscopic examination of the cochleae of 3 generations of this type of lesion shows similar pathological changes from generation to generation. These consist of atrophy of the spiral ganglion cells, atrophy of the organ of Corti, displacement of Reissner's membrane, malformation of the tectorium and others. In old cats atrophy of tympanic muscles is seen. Siblings which have color in their coats show normal inner ears.—Auth. abst.

MAN

17395. BERNSTEIN, MARIANNE MAGNUS, and BARBARA S. BURKS. (Carnegie Inst. Washington, Cold Spring Harbor, L. I.) The incidence and Mendelian transmission of mid-digital hair in man. *Jour. Heredity* 33(2): 45-53. 2 fig. 1942.—No significant difference in sex incidence was found under 18 yrs. The ♂♂ showed no marked age trend after this age but the ♀♀ showed a decided drop in affected cases after age 21. Subjects of Irish derivation appear to have less mid-digital hair than do other North-Europeans and the Italians even less, especially if they are dark-haired. The combinations of 1, 2, 3, and 4 affected fingers reported by Danforth as most frequent were found to hold with few exceptions in the present data. Danforth's finding that with very few exceptions a child will have digital hair on no more fingers than its more hairy parent was confirmed. Bernstein offers a multiple allelomorph hypothesis, *A₀*, *A₁*, *A₂*, *A₃*, *A₄*, to account for distinction of the hair on the digits. If *A₀* and *A₄* are separate alleles, there appears to be phenotypic overlapping. Aside from this distinction these 2-generation pedigrees are consistent with the multiple allel hypothesis if proper allowance is made for genetically affected mothers occurring as non-affected phenotypes.—Authors.

17396. BLOOM, DAVID, SAMUEL R. KAUFMAN, and RUSSEL A. STEVENS. (N. Y. Post-Grad. Med. Sch. and Hosp. and Wilkes-Barre Hosp.) Hereditary xanthomatosis. Familial incidence of xanthoma tuberosum associated with hypercholesterolemia and cardiovascular involvement. *Arch. Derm. and Syph.* 45(1): 1-17. 8 fig. 1942.—Familial incidence of xanthoma tuberosum was observed in a Syrian family which in addition to the unaffected but consanguineous parents and 4 unclassified infants consisted of 9 children and 8 half-siblings of the mother. Of the 5 children in whom xanthoma tuberosum developed before the age of 4 years, all showed hypercholesterolemia and 4 died suddenly as a result of xanthomatous lesions in the cardiovascular system. Since hypercholesterolemia occurred without cutaneous involvement in 2 additional children, in the father, and in 5 of the mother's half-siblings it was concluded that hypercholesterolemia was the principal manifestation of the original hereditary factor.—I. C. Winter.

17397. OLIVER, C. P., and R. GRAY. Five generations of cerebellar ataxia in the human and possibilities of its genetic control. *Proc. Minnesota Acad. Sci.* 9: 35-37. 1941.—A kinship is discussed in which cerebellar ataxia appears in 46% of all members over 21 yrs. old. The av. age at death of ataxic members is 37, ranging from 28 to 48. Age of onset ranges from 20 to 33, with the av. age 24.

It is suggested that the family can become free of the ataxia if the children of ataxic parents have no children until they reach age 30 and are free of ataxia.—Authors.

17398. RADOS, ANDREW. (*Beth Israel Hosp., Newark, N. J.*) Marfan's syndrome (arachnodactyly coupled with dislocation of the lens). *Arch. Ophthalmol.* 27(3): 477-538. 6 fig. 1942.—The ocular symptoms consist of myosis, luxation of the lens, spherophakia, and lenticular myopia, almost constantly bilateral. The limbs are very long. The metacarpal bones, the phalanges (especially the terminal

phalanges) elongated giving the spider-like appearance of fingers. There is not only a real increase of length of extremities but a disproportion between length of extremities and height causing increase of span of extended arms in comparison to height. Poor muscular tissue, underdevelopment of subcut. fat, cardiac involvement, laxity of ligaments and joints, and ear anomalies are part of the syndrome. The condition may show hereditary transmission or develop suddenly through mutation.—Andrew Rados.

APPARATUS AND TECHNIQUE

PETER GRAY, *Editor*

(See also Entries 17363, 17523, 17621, 18298, 18336, 18434, 18737, 18741, 19056)

LABORATORY APPARATUS

17399. FEITELBERG, SERGEI. (*Mt. Sinai Hosp., New York.*) A photoelectrical recorder for biological purposes. *Proc. Soc. Exp. Biol. and Med.* 49(2): 177-179. 1942.—Deflections of a mercury or water manometer are recorded photoelectrically. A slide carrying a lamp and a phototube can be moved up and down by an electrical motor which is controlled by the phototube current, itself actuating a relay. When light strikes the phototube, the slide-lamp-phototube assembly goes down; when the light is cut off by the opaque fluid, the slide goes up. This results in an oscillation of the slide at the level of the fluid since the manometer tube is positioned between the lamp and phototube. The period of the apparatus is $\frac{1}{2}$ sec.; the maximal speed is 2 cm per sec. An ink writer attached to the slide records on a kymograph. The apparatus can be used also to record deflections of any lever or pointer, eliminating all friction between paper and the writing point.—Sergei Feitelberg.

17400. HARDING, E. R. (*Mellon Inst.*) Cereal cellulose, a roughage material suitable for experimental animal diets. *Science* 95(2461): 234. 1942.—A probable shortage of agar may require its removal from basal diets: cereal cellulose is suggested as a substitute. It is a normal constituent of herbivorous and omnivorous diets and there is no evidence of any nutritional factor. As commercially prepared from rice hulls the non-cellulose constituents are limited to coloring matter, Si and traces of Fe; Ca and P are absent. Thiamine and Riboflavin tests are negative. The material is largely indigestible by white rats; no other animals have yet been tested.—B. Horner.

17401. LAUFFER, MAX A. (*Rockefeller Inst., Princeton, N. J.*) A sensitive check valve. *Science* 95(2466): 363-364. 3 fig. 1942.—Describes a simple and highly sensitive check valve, consisting of a thin sheet of rubber resting against the opening of a hole drilled into a "lucite" rod. Pressure differences as low as $\frac{1}{2}$ cm. of water have been found sufficient for its operation.—M. A. Raines.

17402. SCHOLANDER, P. F. (*Swarthmore Coll.*) Microburette. *Science* 95(2459): 177-178. 1 fig. 1942.—Mercury is displaced by the spindle of a micrometer, or by smaller spindles replacing the original. Moving an ordinary micrometer spindle through 25 mm. displaces around $\frac{1}{4}$ cc, which is precisely divided into 2,500 parts. Accuracy is of the order of one part in 10,000 of the total delivery capacity of the burette. On replacing the micrometer spindle with 1/16-inch drill rod, a burette was found to measure delivered amounts, with an accuracy of 1/200 mm³.—M. A. Raines.

17403. WESTON, WILLIAM H. (*Harvard U., Cambridge.*) A Petri dish holder for mechanical stages. *Science* 95(2468): 415-416. 2 fig. 1942.—Consists essentially of a spring-steel clip which firmly holds the dish, and is carried by a frame that fits snugly into the slide holder of the mechanical stage.—M. A. Raines.

17404. ANONYMOUS. Moisture meter. *Indust. Equip. News* 10(4): 23. 1 fig. 1942.—Employs an electronic tube in a circuit recording dielectric capacity. Depth of penetration on wood products is 6 to 8 inches over an effective area of 10-in. diam. Representative materials that can be tested include lumber, pulp, paper, grain, flour, chemicals, plastic materials which do not have too high a dielectric capacity. Dial calibrations are supplied for any given material. Manu-

facturer: Wilbur Instrument Co., 1121 N. W. Glison St., Portland, Ore.—M. A. Raines.

MICROSCOPY AND TECHNIQUE

17405. ANDERS, M. V. (*Brown U.*) An inexpensive apparatus for cutting tissue sections on the sliding microtome by the "dry ice" method. *Stain Technol.* 17(2): 85-87. 2 fig. 1942.—A simple apparatus is descr. utilizing "dry ice" instead of liquid CO₂. An additional advantage is the small amt. of space required by this apparatus.—C. G. Kadner.

17406. BATES, JAMES C. (*Kansas State Coll. Agric.*) On the structure and staining of starch grains of the potato tuber. *Stain Technol.* 17(2): 49-56. 20 fig. 1942.—Procedures are descr. for the differential staining of starch grains of the potato tuber with hematoxylin, and for double staining with safranin O and fast green FCF. The staining effects obtained are made possible by the action of a swelling agent. Staining with hematoxylin is preceded by the swelling action of formaldehyde. In staining with safranin O and fast green FCF, the formaldehyde is added to the staining soln. The results obtained are as follows: (1) a clavate-shaped, central struct. composed of small particles arranged in definite layers is revealed within the grain; (2) differential staining of the locus of the grain and the lamellae alternating with it in a small region around the longitudinal axis of the grain; (3) the simultaneous staining and separation of the grain into a cone-shaped peripheral portion and a spherical body containing the locus of the grain which emerges from it; and (4) differential staining of a ring or layer of substance around a spherical refractive body within the grain.—Auth. abst.

17407. CARBONE, MARY S., and DONALD J. ZINN. (*Yale U.*) The plastic ethyl methacrylate in routine laboratory technic. *Stain Technol.* 17(2): 75-78. 1942.—The use of ethyl methacrylate as a permanent, transparent, colorless medium for mounting in toto invertebrate and vertebrate embryos and small adults is demonstrated. The liquid monomer is partially polymerized by heating over a hot-plate, the reaction being aided by the use of benzoyl peroxide as a catalyst. The object to be mounted is fixed, stained, dehydrated, and cleared in the usual manner, and is then infiltrated with the partially polymerized ethyl methacrylate. It is oriented on a hardened base in a glass or porcelain dish, and the mold is then allowed to harden (polymerize) completely at a temp. of 38-40° C under a 250-watt infrared, ultraviolet bulb. After the block is removed from the dish it may be polished by the ordinary metallurgical methods. More than 40 spp. of animals have been satisfactorily treated in this manner.—Auth. abst.

17408. GROVERMAN, LESTER J. (*Lawrence, Kansas.*) A modified quadruple stain for animal tissues. *Trans. Kansas Acad. Sci.* 44: 414-416. 1 pl. 1941.—The dyes used are safranine O, gentian violet, fast green F.C.F., and gold orange. The safranine O soln. was made up as follows: 5 g. of safranine O; 50 cc. of a 50% ethyl alcohol soln.; 50 cc. of cellosolve; 4 cc. of formalin; 0.5 g. of Na acetate. The cellosolve acts as a solvent of the clove oil used; the formalin acts as a mordant, while Na acetate accentuates the safranine O. The gentian violet soln. was prep'd. as a 0.1% aqueous soln. The fast green F.C.F. was prepared by adding one part of a saturated soln. of the dye in equal parts of clove oil and cellosolve to 2 parts of 95% alcohol.

The gold orange soln. was prep'd. as a saturated soln. in equal parts of clove oil and cellosolve, one part of which was then added to 2 parts of 95% alcohol. The staining procedure was: paraffin sections are brought down to 70% alcohol; stained in safranine O for 24 hrs.; rinsed in tap water; transferred to gentian violet for 1½-2 min.; rinsed in running water, then placed for 30 sec. in equal parts of 95% alcohol and cellosolve; immersed in fast green F.C.F. soln. for 60 min.; rinsed for 30 sec. in a mixture of 2 parts 95% alcohol with one part cellosolve; stained in gold orange 45 min.; rinsed in a wash of equal parts clove oil, absolute alcohol, and xylol; rinsed in a mixture of 25 parts xylol with one of absolute ethyl; rinsed in several changes of xylol and mounted.—*From auth. abst.*

17409. HARTMAN, FRANK W. Jr., and F. W. HARTMAN. (*Henry Ford Hosp., Detroit, Mich.*) Improved mechanical microtome knife sharpener. *Proc. Soc. Exp. Biol. and Med.* 49(2): 167-169. 1942.—The improved microtome knife sharpener consists of a removable glass plate mounted on rubber vacuum cups and a geared motor; an automatic knife turning mechanism is described which swings the knife through either an ellipse or an arc.—*F. W. Hartman.*

17410. LIEBMAN, EMIL. (*Tulane U.*) Simultaneous staining with Sudan-hematoxylin. *Stain Technol.* 17(2): 89. 1942.—70% alcoholic Sudan III with Delafield's or Ehrlich's hematoxylin stains fat, nucleus and cell structures simultaneously.—*C. G. Kadner.*

17411. LILLIE, R. D. An improved acid hemalum formula. *Stain Technol.* 17(2): 89-90. 1942.—Hematoxylin 5 g., NaIO_3 1 g., $\text{AlNH}_4(\text{SO}_4)_2 + 12 \text{H}_2\text{O}$ 50 g. Dist. water 700 ml., glycerol 300 ml., glacial acetic acid 20 ml.—*C. G. Kadner.*

17412. LILLIE, R. D., and M. A. ROE. Studies on polychrome methylene blue. *Stain Technol.* 17(2): 57-63. 1942.—The absorption spectra of eosinates of thiazin dyes in water exhibit absorption maxima at the same spectral locations as do the individual component dyes in aqueous soln. Commercial samples of Wright's stain showing thiazin ab-

sorption maxima between 620 and 660 millimicrons generally give satisfactory blood stains. Nuclear staining is redder and cytoplasm grayer blue in 620-640 range, and consequently staining of malaria parasites is less satisfactory in that range. The best malaria stains show their thiazin absorption maxima usually between 650 and 660 millimicrons. Successive batches of Wright's stain made by the same manufacturer, as well as experimental laboratory lots, may show wide variations in their thiazin absorption maxima and in their staining characteristics.—*Auth. abst.*

17413. MICKEY, GEORGE H., and HOWARD TEAS. (*Louisiana State U.*) Two convenient washing devices for tissues and slides. *Stain Technol.* 17(2): 65-68. 4 fig. 1942.—Two improved mechanisms are descr.: (1) For washing fixed tissues, a device which utilizes a downward movement of water with a consequent thorough washing is most convenient because the washing tubes may be removed or replaced instantly. (2) A pan for washing microscope slides, fitted with a valve stem from an automobile inner tube, produces unusually effective washing and accommodates as many as 80 slides at once.—*Auth. abst.*

17414. OLSEN, M. W. (*Maryland Agric. Exp. Sta.*) A simple method of transferring tissues. *Stain Technol.* 17(2): 73-74. 1 fig. 1942.—A tissue carrier is descr. and diagrammed whereby delicate tissues need not be handled individually during staining process.—*C. G. Kadner.*

17415. TAHMISIAN, THEODORE N., and ELEANOR H. SLIFER. (*State U. Iowa.*) Sectioning and staining refractory materials in paraffin. *Science* 95(2463): 284. 1942.—"The method is rapid, simple, gives perfect thin, serial sections of materials ordinarily very difficult to cut, and insures fine cellular detail." The materials used in testing the method consisted of the following: frog heads, skin from frog, skin from seven-day-old rat, grasshopper eggs, amphibian eggs in early cleavage stages, compound eyes from grasshopper, compound eyes from beetle, human lens with cataract, and pathological human liver tissue.—*M. A. Raines.*

HUMAN BIOLOGY

EARL W. COUNT, *Editor*

(See also Entries Chromosomes in human intersexes, 17374; New paths in genetics, 17380; Hb values and nutritional status, 17632; Sex cycle in normal woman, 17839; Hormone metabolism in pregnancy, 17919; Results of hearing tests, 17949; Physiol. of sheep, 17971; Speech disorders, 17984; Electrocardiograms of Indian girls, 18036; Malnutrition of children in Brazil, 18113; Effect of early and late brain injury on adult intelligence, 18234; Dental caries in Vikings, 18254; Dentition of Greenland Eskimos, 18267; Vital capacity studies, India, 18306; Sella turcica and constitution, 18312; Nutrition and favorable environment inducing inheritable physical gains, 18378; Blood-group inheritance, 18496; Leprosy, 18618; Dental status of young adult males, 18623; Tuberculosis control, 18627; The "index person" in public health studies, 18630; Geographical pathology of China, 18651; Physical status of young men, 1918 and 1941, 18664; Tuberculosis statistics, 18669; Aspects of malaria, 19170)

POPULATION, FERTILITY, VITAL STATISTICS

17416. GOODENOUGH, F. L. Month of birth as related to socio-economic status of parents. *Jour. Genetic Psychol.* 59: 65-76. 1941.—Birth months of 3,275 children were tabulated according to parental socio-economic status. In the 3 lowest occupational groups, births were nearly equally divided among the 4 seasons; but in the 3 highest groups, a statistically significant decrease in winter births was accompanied by an increase in spring and summer births. These data, together with questionnaire replies from 7 leading pediatricians in the city of Minneapolis and 33 women from a superior residential district, indicate that parents of superior socioeconomic and intellectual status arrange for the births of children in the desirable spring months. This appears to account for the small but consistently observed differences in intelligence of children grouped according to birth month.—*D. K. Spelt (courtesy Psychol. Abst.).*

17417. KISER, CLYDE V. Intra-group differences in birth rates of married women. *Milbank Memorial Fund Quart.* 19(2): 147-170. 6 fig. 1941.—Analysis of birth rates among families studied in the National Health Survey of 1935-36 in respect to 3 variables, occupation of family head, education of wife and family income indicate that within groups standardized with respect to 2 of these variables the

family income was more closely related to fertility than were the other 2 factors.—*E. K. Kline.*

17418. McCLEARY, G. F. Australia's population problem. *Milbank Memorial Fund Quart.* 20(1): 23-34. 1942.—A decline in birth rate of the Australian population since 1912 has been masked by the exceptionally low mortality. Estimates indicate that with the present fertility rates the population will reach a maximum size within the next 40 years and begin to decrease before the end of the century even though the large scale immigration of the pre-depression years continues.—*E. K. Kline.*

17419. MOSHINSKY, PEARL. (*Brooklyn Coll.*) Social environment as a modifying factor in the correlation between maternal age and intelligence of offspring. *Milbank Memorial Fund Quart.* 20(1): 47-60. 1942.—Data of maternal age at time of birth was collected from 4,000 of an original sample of 10,000 London school children. Analysis showed an apparent downward trend in intelligence of children with advancing age of mothers. Breakdown of the sample into socio-economic groups as measured by whether the pupils were "free" or "fee-paying" indicated that this tendency was largely among the children of manual workers and that there was a reversal in trend within the socially superior group. Since intelligence is associated with size of families this effect may be caused by the fact that

children born later in life are more frequently in larger families. Data for first born showed no consistent trend among the free pupils but the upward tendency for later maternal age groups remained in the more fortunate social groups.—E. K. Kline.

17420. MYRDAL, ALVA. *Nation and family. The Swedish experiment in democratic family and population policy.* xv+441p. Harper and Brothers: New York, 1941. Pr. \$4.—Family and population as a concern of the State are the thesis of this volume. The data considered are based upon social problems of modern Sweden, but the report was written in the U. S. with American problems in mind. The 17 reports of the *Swedish Population Commission, 1935-38*, are presented in digest form. The book is a nice balance of biology and sociology: the biology of family-building and population dynamics, the sociology of family structure and socio-political integration of family units. The author contends that quality and quantity of population and of the family as an institution must be the basis for post-war social re-building. There are numerous tables of pertinent family and population figures to present status and point trend in Sweden, with suggestions as to the rôle of the State in guidance and control. The cultural, rather than the physical, anthropologist will find this volume of great use, but both groups receive a good illustration of the rapport between biological and sociological materials.—W. M. Krogman.

17421. REED, LOWELL J., et al. *Progress report on the study of the social and psychological factors affecting fertility.* *Jour. Heredity* 33(3): 106, 112. 1942.

17422. SEMYONOV, A. *Longevity.* *Sci. and Culture* 7 (3): 165-168. 1941.—The human life-span is almost 70 yrs., though apparently authentic living cases run up to act. 136. Buffon stated an animal lives 5-7 times the length of its growth period. Metchnikoff's theories of longevity are well known. Bogomolets regards connective tissue as a vital agent against disease invasions. His experiments with blood serum inoculations in mice and men in treating (according to case) cancer, typhus, schizophrenia, bone fractures apparently have had success. He suggested "auto-catalyzers"—substances from the very early stages of tissue decay—which when transfused can stimulate analogous tissues; e.g., as in blood transfusion. Bogomolets recommends simple living-habits for longevity.—M. D. Rogick.

17423. ANONYMOUS. *American longevity approaches threescore and ten.* *Statist. Bull. Metropolitan Life Insurance Co.* 22(12): 6-8. 1941.—Life expectancy tables prepared by the Statistical Bureau of the Metropolitan Life Ins. Co. show an av. length of life of 63.77 yrs. in 1940. The improvement in longevity since 1900 a.mts. to 21 yrs. for colored persons and 15½ for white, but the length of life of colored persons is still 10 years less than the white.—J. P. Scott.

BEHAVIOR

17424. BRYNGELSON, BRYNG. (U. Minnesota.) *Investigations in the etiology and nature of dysphemia and its symptom, stuttering.* *Jour. Speech Disorders* 7(1): 15-26. 1942.—Some of the evidence regarding stuttering is presented in a review of the literature, and the author's own clinical experience is given as substantiating the hypothesis that stuttering is a symptom of the deeper complex dysphemia, which is in turn an atavistically behaving pathological state of the organism resulting from various causes—genetic, parturitional, trauma, febrile conditions, etc. Failure to develop cerebral dominance and consequent ambilaterality is the central focus. Correction depends on materials and techniques in the following areas: neurologic, physiologic, sociologic, psychologic, physical and vocational.—M. F. Palmer.

17425. MATHER, KIRTEL F. *Man's physical environment and man's behavior.* *Sigma Xi Quart.* 29: 130-142. 1941.—Bibliography of 9 titles.

17427. MQNTAGU, M. F. ASHLEY. (Hahnemann Med. Coll., Philadelphia.) *The nature of war and the myth of nature.* *Sci. Month.* 54(4): 342-353. 1942.—This article attempts to disprove the idea that war is a natural phenomenon. Although some claim that a struggle for existence is a law of nature, wars are purely man-made.—F. R. Hunter.

17428. SHELDON, W. H. (With the collaboration of S. S. STEVENS.) *The varieties of temperament.* x+520p. 4 fig. Harper and Brothers: New York, 1942. Pr. \$4.50.—This book is the psychological counterpart of the previously published "Varieties of Human Physique." Here 3 major behavior types are set up: viscerotonic, somatotonic, cerebrotonic, corresponding in principle to the morphological endomorphic, mesomorphic, ectomorphic. A 20-point trait scale is set up for the analysis of each temperament. Each trait in the scale is then assessed or weighted on a 1 to 7 basis, expressing degree of intensity. Accordingly, the weighting for each temperament may range from 20 to 140. As in the earlier work, it is assumed that each individual is a blend of all 3 behavioral elements. The raw scores are themselves rated 1 to 7 by referring the sum of each temperament assessment to a conversion scale; e.g., a subject is rated 130 in viscerotonia, 30 in somatotonia, 25 in cerebrotonia. This person (see table on p. 95) is a 7-1-1, a viscerotonic. Six case histories are analyzed in detail to illustrate procedure and interpretation, and a number of special types are briefly discussed. An extremely valuable Appendix presents basic data for 200 cases. The book is an unusually well-presented attempt to objectify psychological and behavioral data.—W. M. Krogman.

PHYSIQUE AND CONSTITUTION

17429. GREENWOOD, and M. SMITH. *Bodybuild and some mental traits.* *Occup. Psychol. [London]* 15: 145-154. 1941.—Correlations were run on a large and varied population between the chest circumference-height ratio and intelligence, occupational efficiency, nervous symptoms (clinically determined), and speed and accuracy of movement. Results indicate that this measure of body-build is of no practical value in selection, and "there seems no chance of a short-cut to the measurement of such mental qualities as temperament and efficiency."—W. S. Verplanck (in *Psychol. Absts.*).

17430. WOLFF, GEORG. *Further results on the trend of weight in white school children.* *Child Development* 12: 183-205. 1941.—Bibliography of 10 titles.

MISCELLANEOUS

17431. GEHLEN, A. *Der Mensch. Seine Natur und seine Stellung in der Welt.* 471p. Junker und Dünhaupt: Berlin, 1940. Pr. 14M.—Gehlen's thesis is that man is an as yet unstabilized creature and that, in comparison with the animals, he is exceedingly poorly adapted. Actually, human biology is not comparative but is the problem of how such a strange unadapted being continues to exist by compensating for his deficiencies with his ability to act and to work. The first section of the book takes up recent anatomical and embryological studies on man's special position. The 2d is devoted to a pragmatic theory of perception and movement, speech, play and phantasy, and the problems of truth and knowledge. The 3d section includes the drives and their laws (inhibition, displacements, etc.), and character, religions, and philosophies, as the highest guiding systems of action.—M. E. Morse (in *Psychol. Abst.*).

17432. HAGGARD, HOWARD W., and E. M. JELLINEK. (Yale U.) *Alcohol explored.* viii+297p. 4 fig. Doubleday, Doran and Co., Inc.: Garden City, 1942. Pr. \$2.75.—The latest scientific information on the alcohol problem is presented in a practical yet objective form. The metabolism of alcohol, its physiol. effects in different cones, and its legitimate medical use as a sedative are described. The immediate effects upon behavior are discussed, and it is suggested that drunkenness be legally defined as a conc. of alcohol in the blood of > 0.05%. Chronic inebriety is regarded as having many causes and limited effects. The rôle of nutrition in alcoholic disease is stressed. A slight rise in alcoholic mental disease rates has been observed in recent years, and a program of education, research, legislation, and medical treatment is recommended.—J. P. Scott.

17433. LEWIS, JULIAN HERMAN. (U. Chicago.) *The biology of the negro.* xvii+433p. University of Chicago Press: Chicago, 1942. Pr. \$5.—A compendium. Disease incidence and behavior may be racially characteristic. Chapters report without bias the findings in I: Vital statistics

and population growth; II: Anatomic features of African and American negroes: African racial types, steatopygy, the integumentary organ (glands; pigmentation, its measurement and genetics; dermatoglyphics; hair), skeleton, myology, viscera, brain; III: Biochemistry and physiology: serological specificity, statistics of biochemistry, race odor, skin physiology, basal metabolism, drug responses; IV: Medical diseases: a) tuberculosis—its behavior among African and American negroes (the discussion is very extensive); b) syphilis—its prevalence, lesions, course; latency; neural and cardiovascular syphilis; congenital incidence; reactions to therapy; c) yaws; d) lymphogranuloma venereum; e) malaria; f) leprosy; g) acute infections (diphtheria, lobar pneumonia, scarlet fever, yellow fever, smallpox, measles, pertussis, influenza, acute poliomyelitis, rheumatic fever, typhoid); h) the anemias, hemophilia, other blood dyscrasias; i) hookworm; j) dietary deficiency diseases; k) psychoses and their organic or physiologic bases, mongoloid imbecility; l) muscular dystrophy; m) diabetes mellitus, alcaptonuria; n) cardiovascular diseases (incidences; arteriosclerosis, hypertension, syphilis, angina, rheumatic heart, thromboangiitis obliterans); o) nephritis; V: Surgical diseases: peptic ulcer, its etiology and incidence; cholelithiasis; urolithiasis; prostate hypertrophy; goiters; the neoplasms; appendicitis; miscellaneous

others; VI: Obstetrics and gynecology; VII: Dermal pathologies (racial differences are marked); VIII: Eye-ear-nose-throat diseases; IX: Dental diseases.—*E. W. Count.*

17434. SHALLOO, J. P. [Ed.] *Crime in the United States: an attempt to understand the basic patterns of causation underlying criminal conduct.* *Ann. Amer. Acad. Polit. and Soc. Sci.* 217. 1-237. 1941.—This is a review of fields of research related to crime causation. The contributors and their topics are the following: J. HALL, crime as social reality; B. SMITH, enforcement of the criminal law; R. H. BEATTIE, the sources of criminal statistics; J. COHEN, the geography of crime; G. B. VOLK, crime in city and country areas; M. F. ASHLEY-MONTAGU, the biologist looks at crime; L. N. YEPSEN, the psychologist looks at crime; W. HEALY, the psychiatrist looks at delinquency and crime; W. C. RECKLESS, the sociologist looks at crime; E. H. STOFFLET, the European immigrant and his children; G. B. JOHNSON, the Negro, and crime; M. PLOSCOWE, crime in a competitive society; E. H. SUTHERLAND, crime and business; A. R. LINDE-SMITH, organized crime; H. MANNHEIM, crime in wartime England; A. MORRIS, criminals' views on crime causation; E. D. MONACHESI, official agencies and crime prevention; and N. CANTOR, organized efforts in crime prevention.—*L. J. Stone (courtesy Psychol. Abst.).*

ANIMAL BEHAVIOR

(See also Entries Inheritance of tractability in ground squirrel, 17390; Adaptations and instinctive behavior, 17482; Crabs, 17485; Animal behavior in migration, 17486; Metrazol shock, 18073; Water-finding and oviposition in mosquitoes, 19267; Mosquito swarming, 19269; Drought as affecting behavior of ants, 19296; Behavior of reptiles, 19329; Bird migration, flyways, 19352; Birds, 19341, 19356)

17435. FRENCH, J. W. (*Princeton U.*) The effect of temperature on the retention of a maze habit in fish. *Jour. Exp. Psychol.* 31(1): 79-87. 5 fig. 1942.—Goldfish were taught a maze at 22°C. Groups were then maintained for a day at each of 3 temps. 28°, 16°, and 4°C. Retention was then measured by relearning tests at 22°C. The group which had spent the retention period at 28° made almost twice as many errors during relearning as the group which had spent the retention period at 4°. One control expt. showed that the results were due to the action of temp. upon retention and not to its action upon the rate of learning. Another showed that the differences were not due to retroactive inhibition produced by general activity during the period of controlled temp. Evidently there exists a forgetting process which is independent of inhibition and whose rate is a function of temp.—*J. W. French.*

17436. HULIN, W. S., and A. R. MOORE. Coordination in starfish. (*Film.*) 360 ft. Psychological Cinema Register: Bethlehem, Pa. Pr. \$18.—Pacific coast starfish were photographed with the camera adjusted to produce artificial accelerated motion during projection. The demonstration is intended to show the facts of starfish behavior without elaborated theories. Normal animals (with 5 rays) were placed on their backs to show the pattern of the righting responses in turning over to normal locomotor positions. Then the nerve ring was sectioned and the righting behavior again observed. Certain "sports" in the form of starfish with 6 or more rays were photographed to show normal righting responses and behavior after sectioning the nerve ring. Animated diagrams illustrate the positions of nerve sections. The pictures were taken through sea water, in the normal environment.—*A. Ford (in Psychol. Abst.).*

17437. ILSE, D. Experiments on the color sense of insects: Responses of bees to blue after training. (*Film.*) 240 ft. Psychological Cinema Register: Bethlehem, Pa. Pr. \$30.—This is a color film picturing the visual discrimination of bees after the method of K. v. Frisch. A piece of plate glass is laid over squares of colored and gray papers of various brightnesses and hues. During the training period the bees are fed on that part of the glass which lies over a blue square. When food is removed, it is demonstrated that the bees have learned to return to blue areas, even after these are changed to chance locations, with brightnesses varied, and surrounded by gray papers of varying brightnesses. When the blue paper is surrounded by other hues, the bees

distinguish the stimulus paper from other hues of longer wave-length, but confuse the blue with violet areas.—*A. Ford (in Psychol. Abst.).*

17438. LAFLEUR, LAURENCE J. (*Brooklyn Coll.*) Tolerance in ants. *Amer. Nat.* 76(762): 85-93. 1942.—Most species of ants exhibit a tendency to avoid fighting, both individually and collectively, and sometimes appear deliberately to avoid hurting alien ants of other spp. The evidence for this is in part derived from the literature of myrmecology, in part the typical behavior of ants during casual contacts and in affiliation expts., in part observations on *Lasius niger* and *mixtus*. The behavior shows resemblances to that of dogs and of men in a way which may be significant.—*L. J. Lafleur.*

17439. MARSHALL, F. H. A. (*Sch. Agric., Cambridge.*) Exteroceptive factors in sexual periodicity. *Biol. Rev. Cambridge Phil. Soc.* 17(1): 68-90. 1942.—The paper summarizes the evidence that periodicity in breeding activity in the higher animals is controlled by an internal endocrine rhythm which is adjusted to external conditions by the action of nervous stimuli acting exteroceptively. It is shown that whatever the stimulus the anterior pituitary is the regulator of the gonadal function, the stimuli acting at any rate generally through the intermediation of the hypothalamus. The evidence indicated further that sexual display usually serves the function of promoting an effective synchronization of the ♂ and ♀ generative processes. All the more recent literature is cited.—*F. H. A. Marshall.*

17440. METFESSEL, M. (*U. So. California.*) The relationships of heredity and environment in behavior. *Jour. Psychol.* 10: 177-198. 1940 (also publ. by Los Angeles County and the Univ. of So. Calif. as Report on W. P. A. project 11596).—The mature song of Roller Canaries consists of vocalizations called tours, differing mainly in frequency of pulsation of pitch. The normal range is about from 3 to 40 per sec. 8 ♂♂ were raised individually from before hatching to the age of 1 yr. in sound-proof cages. The daily sounds made by each bird were studied with microphone, phonograph records, and kymograph. When mature, all birds produced recognizable canary tours; av. pulsation rate was 19 per sec. (about normal), with individual extreme averages of 13.4 and 30.1. It is concluded that the elements of song are hereditarily detd. In other expts. young ♂♂ in sound-proof individual cages were subjected daily to mechanically made vibrato tones of par-

ticular frequencies: 7 per sec. (2 birds); 14 per sec. (4 birds); and 28 per sec. (1 bird). In all but one case the songs developed around the environmental tone. Evidently that hereditary determination can be altered to some extent by environment. Finally all the birds were released together in flight cages and the ensuing songs studied. All tended to lose individuality and approach the average. The significance of these findings in general psychology is discussed.—*W. F. Hollander*.

17441. NICE, MARGARET M. (5708 Kenwood Ave., Chicago.) The role of territory in bird life. *Amer. Midland Nat.* 26(3): 441-487. 1941.—A history of the theory of territory from 1622 to the present. 6 types of territory are distinguished: Mating, nesting and feeding ground; mating and nesting, but not feeding; mating station only; restricted to narrow surroundings of nest; winter; roosting. These types are not rigidly distinct; some birds have territories of one type in one place and of another elsewhere; some have indefinite types. Under such a broad concept of territory, non-territorial birds are rare, the cowbird (*Molothrus ater*) and some parakeets being examples. Territorial behavior is based primarily on a positive reaction to a particular place and a negative reaction to other individuals. Conditioning to an area puts an animal into the best stimulus situation; familiarity with the environment enables it to be dominant there. In the case of nesting territory, the male's fighting reactions are intensified through his instinct to protect his mate, nest, and young. Territory is a device for regulating despotism and a safeguard against interference in the nesting cycle; it also serves in many cases to bring the sexes together and to assist in the formation of sexual bonds. A bibliography of some 400 titles is given.—*M. M. Nice*.

17442. PATTON, R. A., H. W. KARN, and C. G. KING. (U. Pittsburg.) Studies in the nutritional basis of abnormal behaviour in albino rats. *Jour. Comp. Psychol.* 32 (3): 543-550. 1941.—Albino rats were subjected to a specific deficiency of vitamin B₁ and tested regularly for susceptibility to convulsive seizures when exposed to a standard auditory stimulus. The incidence of seizures rose steadily as the deficiency progressed. Paired feeding control animals were tested similarly to rule out the factor of decreased food intake. Both inanition and vitamin B₁ deficiency were found to be important contributing factors to increased susceptibility. Depending upon the degree of inanition and vitamin deficiency involved, either factor may be predominant. A deficiency that is too severe may in turn render the animals less sensitive to seizures than intermediate stages of deficiency.—*E. W. Brown*.

17443. POMERAT, C. M., and E. R. REINER. (U. Alabama.) The influence of surface angle and of light on the attachment of barnacles and other sedentary organisms. *Biol. Bull.* 82(1): 14-25. 1942.—In the curves describing the attachment of 6 groups of organisms in relation to the angle at which glass plates were held, the largest populations were always found at 0° (the under surface of plates in the horizontal position) and the numbers decreased as the angle increased. The areas of 2 spp. of colonial bryozoans were likewise a function of the angle at which the plates were held, the greatest growth being at 0°. This geotropic response was not found for the ivory barnacle, *Balanus eburneus*. Under conditions of natural day-night exposure, twice as many barnacles became attached to black as to opal or clear glass plates. In expts. conducted exclusively at night no difference was observed in the size of populations

attached to black, opal or clear plates. This suggests that a photic factor is of primary importance in the attachment of this barnacle.—*C. M. Pomerat*.

17444. SEASHORE, CARL E. Heredity and environment in the song of the canary. *Sci. Month.* 53(6): 585-586. 1 fig. 1941.—A review of "The relationships of heredity and environment in behavior" by M. Metfessel, *Jour. Psych.* 10: 177-198. (1940).—Excerpts from expts. are given, showing that the song patterns of canaries are hereditarily controlled but that subjection of the birds to certain machine-made sounds induces some imitation.—*W. F. Hollander*.

17445. TINBERGEN, N. Die Übersprungbewegung. *Zeitschr. Tierpsychol.* 4(1): 1-40. 1940.—In many of the vertebrates under conditions of stress certain behavior, which is inappropriate in its character, appears in connection with the stimulus situation. In fish there may occur spontaneous overflow feeding movements when the animal is moving to attack another fish moving across the borders of its territory. Birds when excited may engage in "pseudo-sleep" (tucking head beneath wing) or nest-building. Primates may scratch behind their ears or under their arms when confronted by a difficult problem. The author attempts to arrange and give a causal analysis of this type of behavior. He posts 4 basic causative factors: it arises 1) out of a conflict of antagonistic drives; 2) from the restimulation of an already exhausted activity; 3) from sudden attainment of a goal; and 4) from failure of a necessary external stimulus to appear. These overflow activities, he says, can only be aroused by the existence of pressure in the animal. The activities are of 2 types; inborn, e.g., scratching under the arm in primates, and learned, e.g., key-jingling by man in conflict situations. Although these activities appear to be unrelated to the situation, the author is of the opinion that there exists in the activity an orientation component directed toward the particular situation. The data are mostly observational and as the author states too "paltry" for a conclusive causal analysis.—*H. G. Birch*.

17446. VARLEY, G. C. (Zool. Lab., Cambridge.) On the search for hosts and the egg distribution of some chalcid parasites of the knapweed gall-fly. *Parasitology* 33(1): 46-66. 1 fig. 1941.—The egg distributions of 5 chalcid parasites of the knapweed gall-fly, *Euribia jaceana*—viz., *Eurytoma curta*, *E. robusta*, *Habrocytus trypetae*, *Torymus cyanimus*, and *Eupelmella vesicularis*—were studied in a small area. A distinction is made between search for hosts by random movements, and random search in the sense of Nicholson; these terms are defined. Random movements may give rise to a distribution of parasitism different from that expected if search were purely random. The spp. discussed do not all distribute their eggs at random amongst the hosts: some spp. superparasitize the hosts more, and one (*E. curta*) much less than would be expected if the egg distribution were purely random, owing to peculiarities in oviposition behavior. Parasitism by *E. curta* is unevenly distributed in space, being higher in areas of high host density; this suggests that search is not exactly random, but is also concentrated in space. A tentative explanation is advanced based on the assumption that search is by random movements. Parasitism by *E. robusta* is patchy; this non-random distribution is attributed to random movements performed by a few parasites. These spatial discrepancies do not seriously affect the numerical accuracy of the assumption that search is random in small areas, and that the theory of Nicholson and Bailey may be accurate to a first approximation.—*From auth. summ.*

ECOLOGY

ORLANDO PARK, *General Animal Ecology*
 G. D. FULLER, *General Plant Ecology*
 CHANCEY JUDAY, *Hydrobiology (Oceanography, Limnology)*

FREDERICK A. DAVIDSON, *Ecology of Wildlife Management—Aquatic*
 W. L. MCATEE, *Ecology of Wildlife Management—Terrestrial*

ROBERT G. STONE, *Bioclimatology, Biometeorology*

(Other entries in this issue: [GENERAL AND ANIMAL ECOLOGY]—Surface angle and light incidence as affecting attachment of sedentary organisms, 17443; Population spread of Hungarian Partridge in U. S., 17544; Trends in wildlife populations, 17545; Rat population cycle, Brazil, 18644; Flights of aster leafhopper, 19131; Nematode, 19192; Annelids of China, 19137; Water-finding and oviposition in mosquitoes, 1926; Mosquito-swarming, 19269; Anopheles, 19271; Zoogeography of Hemiptera of Oceania, 19284; Aphis aeroplankton, 19288; Drought as affecting behavior of ants, 19296; Distribution of families of birds, 19332; Insect control by birds, 19344; Avifauna of Southwest Africa, 19350; Birds, 19356. [PLANT ECOLOGY]—Polyploidy and adaptation, cucumbers, 17385; Paleoclimatology of Post-Wisconsin age, 17499; Mycorrhizas of conifers, 18795; Overwintering weeds, Ukraine, 18849; Wind erosion affecting soil fertility, 18889; Vegetation and rainfall infiltration, 18901; Erosion in orchards, W. Va., 18905; Disappearance of magnolia in Puerto Rico, 18950; Soil pH favoring ion absorption by plants, 18991; Eradication of water hyacinth, 19050; Plants and malaria control, Tennessee Valley, 19180; Japanese-American mollusks, 19249)

GENERAL

17447. COOK, C. W. (*Utah State Agric. Coll., Logan.*) Insects and weather as they influence growth of cactus on the central Great Plains. *Ecology* 23(2): 209-214. 6 fig. 1942.—The recent drought of 1930-1940 has brought a very noticeable increase of cacti in grazing lands of the central Great Plains. A study was made during the years 1937 to 1940 to determine the causes of cactus increase in dry years and decrease during the moderately wet yrs. 3 insects—*Chelinidea vittiger*, *Dactylopius* sp., and *Melitara dentata*—played a rôle in the control of cactus. Only the latter 2 were considered of great importance. *Dactylopius*, a mealy bug, lives upon the juices of the cactus plant. During warm, moderately moist yrs. these insects reproduce very prolifically, and cactus plants often become almost totally covered with the insects and soon die. The most important insect, *Melitara dentata*, is a moth whose larvae eat the center of the fleshy stems of cactus, causing death of the plant. This insect destroys large areas, leaving the hollow, dry stems as evidence of its destruction. Moist, warm weather is conducive to population increase of these insects. Rodents, and especially rabbits, play a major rôle in the dispersal of cactus seeds. Rabbits during the late summer and fall of dry years resort to the fruits for food and water, and their well-distributed scats contain numerous cactus seeds with undiminished germination capabilities. Drought is the primary factor controlling the balance between cactus and insects but proper grazing of the native forage greatly aids in producing a favorable habitat for the insects, thus inducing an increase in their numbers and a decrease in cactus.—C. W. Cook.

17448. WEBER, NEAL A. (*U. North Dakota.*) A biocoenose of papyrus heads (*Cyperus papyrus*). *Ecology* 23(1): 115-119. 3 fig. 1942.—Papyrus (*Cyperus papyrus*) covers an area called the Sudd, extending in places 200 miles or more in width along the upper White Nile R. in the Anglo-Egyptian Sudan west of central Abyssinia. This sedge grows 8 to 15 ft. high and terminates in large umbels or heads about 2 ft. in diam. composed of flower spikelets. A biocoenose centers about the papyrus heads and consists of at least 8 spp. of ants and spp. of other orders of Arthropoda, chiefly Orthoptera, Coleoptera, parasitic Hymenoptera and Arachnida. 4 of the ant spp. and several spp. of beetles

and spiders resembled each other in size, general body shape and color, the color being a reddish ferruginous blending in well with papyrus to the human eye. The resemblance between 2 spp. of spiders and 3 ant spp. in body shape was marked.—N. A. Weber.

17449. YEAGER, LEE E. Coal-stripped land as a mammal habitat, with special reference to fur animals. *Amer. Midland Nat.* 27(3): 613-635. 1942.—Coal-stripped land constitutes in the central states a small, recently-created, biological habitat. Both land and water areas are present, and steep, parallel ridges and narrow valleys are characteristic. Succession for both plants and animals, although lacking in uniformity due to variations in mining, is similar to that on other bared areas, but the rate is slower because of more adverse site conditions. Light-seeded plants, both woody and herbaceous, first invade stripped areas. Mammal succession usually begins with *Microtus* and cottontail rabbits and ends, to date, with gray squirrels and raccoons. The habitat is deficient for strictly forest species, but improves as forest cover develops. Muskrats and minks are the most important fur animals. Foxes, skunks, weasels, and coyotes, and other fur animals occur in varying numbers. Muskrat production on certain older mines compared favorably with that on drainage ditches and a large stone quarry; greater than that on streams in the same locality. In general, the density of both fur and non-fur animal populations is directly proportional to age, until plant succession begins to influence change in species. Among non-fur mammals, woodchucks, cottontail rabbits, and common moles may be abundant; 13 additional spp. have been reported. Others probably occur. The sanctuary

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value of stripmines appears to be considerable, and wildlife seems destined to play an important part in the utilization of this land type.—L. E. Yeager.

17450. ANONYMOUS. Ground water—its development, uses and conservation: description and location of the ground water provinces of the United States. *Johnson Nat. Drillers' Jour.* 13: 1-12. 1941.—This article describes and locates the principal ground formations of the U. S. as detailed by O. E. Meinzer in U. S. Geological Survey, Water Supply paper No. 489. The Geological Survey recognizes 4 major rock groups, each covering an era in geological history. These 4 groups are composed of 12 rock systems.

From the standpoint of ground water, the surface of the country is composed of rocks of different systems, of differing origins, and no 2 are alike. Most of them are deeply buried. The location of basal rock formation is important, because it indicates the hard, impermeable bottom below which ground water is not economically available. In northern U. S., the basal rock formation is covered with glacial drift, and shallow screened wells can be used. In southern U. S., there is no glacial drift, and water is obtained from basal rock with drilled wells or from the waste formed from the decay of basal rock. The various rock groups are discussed in order, the oldest being in the New England States, Piedmont Plateau, Adirondacks, and Appalachian region. Properties of water arising from each rock group are discussed. Maps are given locating the principal rock systems. The youngest geologically and the most important to well drillers is the Quaternary group. These deposits cover a larger surface area, are composed of glacial drift, sand, and gravel, and contain the most water. The 21 ground water provinces of the U. S. are listed in detail, with a discussion of the rock formation, ground water supply, and comments on water quality. A map of the U. S. is given showing the location of the provinces.—*M. J. Blew* (in *Publ. Health Engineer. Absts.*).

BIOCLIMATOLOGY, BIOMETEOROLOGY

(Other entries in this issue: Moisture meter, 17404; Month of birth, *Homo*, 17416; Man's physical environment, 17425; Insects, weather and cactus, 17447; Ground-water provinces in U. S., 17450; Chinch-bug populations, 17474; Paleoclimatology of Post-Wisconsin age, 17499; Submarine light intensity, 17516; Mexican lake, 17519; Fractionation of u.-v. dose as affecting erythema effect, 17581; Environmental factors affecting erythrocyte count, cattle, 17622; Human physiology under high pressure, 17803; Seasonal effects on gestation in ermine, 17923; Seasonal variation in reactive hyperemia, 18000; Antirachitic effectiveness of fall and winter sunshine, 18230; Sunspot cycles and rat plague in Brazil, 18644; Life at high altitudes, 18658; Humidity and spore germ in fungus, 18798; Wind and pollination, 18864; Vegetation and rainfall infiltration, 18901; Floods, droughts and the tree-ring record, 18954; Temp. and rate of wheat development, 19017; Length of photoperiodically effective twilight period, 19023; Genetic effect of photoperiod and temp., 19026; Flights of aster leafhopper, 19131; Grape berry moth, 19143; Grape moth, 19144; Drought as affecting behavior of ants, 19296)

17451. BOER, H. J. de. On the physical reality of some long periodic cycles in the barometric pressure of Batavia. *Koninklijk Magnet. en Meteorol. Observatorium Batavia, Verhandel.* 29. 1-21. 1941.—The long series of pressure readings at Batavia (beginning with 1866) is studied with the aid of a rough method for detecting the probable existence of periods, which is merely the sign-coefficient of correlation. It is relatively simple compared with the elaborate methods usually employed to compute the correlation coefficient, since it involves only the degree of coincidence (same sign) or non-coincidence (opposite sign) of the compared departures of the series. The results suggest the existence in the air pressure at Batavia of periods having approx. mean lengths of 2.33, 3.33, 6, 7.33, 8 $\frac{1}{2}$, 11, and 16 yrs. Of these the 6-yr. period is the best developed, which leads the author to a study of the 6-yr. period throughout the world. It is equally well-developed in the S. Pacific Ocean, in the vicinity of New Zealand, and in the northern part of the N. Atlantic Ocean, towards Greenland. Finally, the author postulates that the 6-yr. period is a result of interaction of other periods found by him and other workers.—*I. I. Schell.*

17452. CHURCH, PHIL E. The summer-time vertical humidity-gradient over the cold water of the San Juan Archipelago. *Trans. Amer. Geophys. Union* 1941. 484-489. 2 maps, 1 fig. 1941.—From the observations made of the wind velocity and vapor pressure at 1, 2, 4, and 10 m. above the cold water of the San Juan Archipelago, there exists, for light to moderate winds, an increase in wind velocity which is a linear function of height above 2 m. when the air exhibits a marked inversion of temp. This increase in

velocity with height does not follow the well established law that with no increase of potential temp. upward the wind velocity is a function of the logarithm of height. Further, the vapor pressure within the lower 10 m. of the air over cold water shows a decrease downward to the surface. There is a marked discontinuity between 1 and 2 m. which corresponds to the marked discontinuity at the same height in the wind profile. Because of the decrease of vapor pressure downward from 10 m., condensation is occurring at the surface. Therefore, the salt water would be reducing the moisture content of the overlying air. The height of the air from which the water is extracting moisture will be determined by the temperature difference between the air and the surface water and the length of time of the air over the water. The lid of the inversion is higher than 10 m.—*Auth. Abst.*

17453. COURTRIGHT, L. J., S. H. HURWITZ, and ABBIE BETTS COURTRIGHT. (*Stanford U.*) Inhalant sensitization in guinea pigs under controlled atmospheric conditions. 1. Description of air-conditioned chamber and fundamental principles underlying its use. *Jour. Allergy* 13(3): 271-282. 1942.—A description of an air-conditioned chamber for study of laboratory animals under controlled meteorologic conditions. Guinea pigs sensitized with horse dander were shocked by inhalation and weather conditions in the chamber modified the reactions.—*J. H. Black.*

17454. CROWDEN, G. P. Thermal insulation in polar huts. *Polar Record* 18: 131-136. 1939.—To maintain a comfortable condition inside not only must the construction be wind-proof but thermally well insulated, which necessitates materials of low conductivity which are not too bulky or costly. If an air space between wooden layers of a wall be divided medially by a thin metallic foil (aluminum) of high reflectivity on both sides and of low emissivity and capacity for radiant heat, a very effective insulation is obtained. This was tried by Brit. Graham Land Exped. 1934-37, and the Byrd Exped. with success the heating necessary being moderate and the temp. diff. between floor and ceiling less than usual. Likewise, as the author has indicated in earlier papers (*Jour. Inst. Heat. and Vent. Engrs.* 6(69): 1938), the same metal foils can be used in the tropics to prevent solar radiation penetrating rooms. A foil faced screen between a cold wall and the body will prevent excess radiation loss to the wall and permit comfort at lower air temp. than otherwise.—*R. G. Stone.*

17455. DOBBY, E. H. G. The climate of Singapore. *Geogr. Rev.* 30(1): 84-109. Illus. 1940.—A neat, accurate, modern description of a tropical climate. The Intertropical Front between the equatorial No. and So. Pacific air masses passes over S. during Apr.-May and Oct.-Nov., with many thunderstorms, calms, and frequent circular-isobared depressions in which rain falls from long gently inclined discontinuities between the above mentioned air masses. Both air masses are unstable with equally showery cumulus weather; "monsoon" is a misleading description as both air masses bring similar weather (summer and winter), the word is probably a relic of colonial associations with India. The humidity is always high (75-95%), but nights are cool from radiation to clear skies and breezes—the reason for Singapore's reputation for white tolerability. Rainfall and temp. normally have a small seasonal range, but rainfall is very unreliable. Daily range < 12°F.; summer is warmer by virtue of higher daily minima rather than max. Clouds and showers in afternoon are frequent and cause a marked cooling. Typhoons are unknown.—*R. G. Stone.*

17456. DRYDEN, et al. Fluid mechanics and statistical methods in engineering. 146p. University of Pennsylvania Press: Philadelphia, 1941. Pr. \$1.75.—This volume contains 2 groups of 4 papers each, the 1st group dealing with fluid mechanics and the 2d with statistical methods in engineering. A paper by Dryden illustrates the fundamental concept of laminar and turbulent flow, boundary layer, transition, etc., by the example of flow around an infinitely long cylinder. Von Kármán treats the flow of compressible fluids for which the velocity approaches that of sound and discusses applications to exterior ballistics. Papers by Kalinske on turbulence and suspended material transportation and by Sherwood on mass transfer and friction in turbulent flow are rather technical, but should be useful to the meteorol-

ogist who is dealing with problems of erosion control and evaporation. Among the 2d group of papers, that of W. Shewhart on contributions of statistics to the science of engineering is most noteworthy. It should be of great interest to all those who, dealing with the difficult problem of applying statistical methods to the weather, are striving for a better understanding of the concepts and methods of statistical analysis. The writer has much to say that with proper modification could apply to meteorological statistics.

—W. M. Elsasser.

17457. GARDNER, V. R. The average growing season and departures there from in lower Michigan. *Quart. Bull. Michigan Agric. Exp. Sta.* 24(4): 312-318. 1942.—Av. monthly mean, max. and min. temps., as recorded by the U. S. Weather Bureau and covering a 50-yr. period for several representative stations in Michigan, are summarized. Typical phenological data, including blossoming and ripening dates for several fruit vars., as recorded during this same period, are presented and correlated with the temp. records. Tables are presented, based on the temp. and phenological records, that can be used as a basis for classifying any particular season as average, early or late and, if early or late, by approx. how many days.—V. R. Gardner.

17458. GIDDINGS, J. LOUIS. (U. Alaska, College, Alaska.) Dendrochronology in northern Alaska. *Univ. Arizona Tree-Ring Lab. Res. Bull.*; Also in: *Univ. Alaska Misc. Publ.* 4. 1-107. 15 pl. 22 fig. 1941.—Tree-ring studies of > 100 groups of increment borings from living trees (*Picea canadensis*, *P. mariana*, *Larix alaskensis*) in central and northern Alaska reveal 2 dominant chronologies (successions of ring-widths): timberline and river-bottom types. The former appears to parallel year-to-year changes in mean June temp. and the latter appears under the influence of temp. during a longer growing period. Some groups of specimens from intermediate elevations in interior Alaska show a mixture of the 2 chronologies. Concurrent fluctuations in growth are found across 500 miles in the timberline record, over a region in which timberline drops from about 3000 ft. near Fairbanks to sea-level near the west coast. The records in driftwood deposited on the coast of western Alaska, and whose source must be mainly the undermined banks of large rivers, may be dated; thus potentially the tracing of ocean currents becomes possible by a new method. About 2000 wood specimens from archaeological ruins are studied and many are dated. The dating of buried wood in silt deposits near Fairbanks indicates a redeposition of the silt in this locality. Data supporting the results are in the form of 35 growth curves up to several centuries in length, and 31 tables of group mean measures of ring-widths.—Edmund Schulman.

17459. GORDON, HAYDEN S., and R. L. PERRY. (Agric. Exp. Sta., Berkeley, Calif.) Air conditioning for houses in California. *California Agric. Exp. Sta. Circ.* 351. 1-48. Map. 1942.—In the human body, heat is generated by the oxidation of food substances, both as a help in maintaining a uniform body temp. and as a concomitant by-product of muscular activity. This heat is dissipated largely at the body surface, by the simultaneous heat-transfer processes of conduction, convection, radiation, and evaporation. Comfort is greatest when the adaptive demands made upon the heat-dissipating mechanism are small. For opt. well-being, however, climatic variability should be reduced rather than eliminated. The achievement of desired temp. conditions is the foremost problem in improving comfort, with air movement, purity, and humidity also deserving consideration. Insulation is an economical means of improving summer comfort and also of reducing winter heating costs. Further improvement may be effected by supplementary structural and external treatment. In some parts of the state, the large daily temp. variations permit night-air cooling of the house. In areas of low rel. humidity, comfort can be improved by means of evaporative coolers. Special local conditions may permit the effective use of certain types or applications of equipment. One may control all the elements of air conditioning by using refrigeration and supplementary equipment.—H. S. Gordon.

17460. GROVE, EWART. (Cuyahoga Heights High Sch., Cleveland, Ohio.) The relation of temperature and snow cover to spring bird arrival. *Proc. Minnesota Acad. Sci.* 9:49-57. 1941.—The temp. for March, 1938, at St. Cloud,

Minnesota, was considerably above the average, and various spp. of birds arrived much earlier than their average arrival time as shown by the records for a 9-yr. period; but during a following brief cold stormy period the number quickly dropped and those spp. arrived when the temp. again rose to normal. For each yr. the various spp. arrive at very nearly the same air temp. while the week of arrival varies considerably in the St. Cloud area. The spp. seem to arrive according to temp. rather than according to time. Other important factors in species arrival are snow cover and available food supply, which are generally dependent on the air temp. Few spp. arrive in considerable numbers until the snow cover has melted down to under 6" or 4" in av. depth. This exposes considerable quantities of seed for the herbivores. The bulk of the waterfowl and carnivores arrive when most of the snow and ice has melted from the fields and streams. The insectivores arrive in the greatest numbers in May when the av. air temp. is ca. 50° F., at which time insects are becoming abundant.—Ewart Grove.

17461. HAURWITZ, B. The physical state of the upper atmosphere. *Jour. Roy. Astronom. Soc. Canada* 1936/7: viii + 96p. 1941.—This monograph presents a comprehensive, accurate, not too technical account of the variety of physical phenomena to be found in the upper atmosphere. The chapters are: 1) Introduction, troposphere and stratosphere; 2) some optical phenomena, mother-of-pearl clouds and noctilucent clouds; 3) meteors; 4) the light of the night sky; 5) propagation of electric waves and ionization; 6) diurnal variation of terrestrial magnetism; 7) the aurora; 8) ozone; 9) anomalous propagation of sound; 10) the composition and structure of the atmosphere. In the introduction of the new edition the bibliography is brought up to date and recent progress is briefly mentioned, notably the theory of atmospheric oscillations of Pekeris and the investigations of ozone by Meetham, Wulf, and others.—W. M. Elsasser.

17462. HUTCHINSON, F. W. Temperature as a health factor in air conditioning. *Heating and Ventilating* 38: 27-29. 1941.—Opt. environmental conditions exist at some air temp. lower than 75° F., the exact value depending on the season, the outside temp., and the degree of activity of the occupants. As the dry-bulb temp. rises above this optimum value, physiol. adjustment is possible without evidence of acute discomfort or danger to health until conditions equivalent to an "effective temp." of 85° F. (as 85° F., 100%; 90° F., 70%; 95° F., 50%; 100° F., 40%) are reached. Above this "effective temp." acute effects, such as fever and rapid pulse and chronic effects due to anemia of the vital organs, may lead to a serious impairment to health. For conditions of heavy work the critical limit is below 85° F. and 100%.—K. M. Morse (in *Publ. Health Engineer. Absts.*).

17463. JACOBS, WOODROW C. (U. S. Weather Bur., El Centro, Cal.) A survey of frost conditions in the Imperial Valley of California. Multigraphed. (U. S. Wea. Bur., Pomona, Cal.) 31p. 16 maps, 1941.—Frost hazards to farming throughout the great winter fruit and truck producing area of the Imperial Valley in California are given in detail in this Bulletin. Based on the records of 27 temp. stations over an 8-yr. period, a comprehensive picture of the temp. distribution on frosty nights in all portions of the Valley is presented. Only those records obtained on nights when the temp. fell to 32° or lower at one or more of the 27 stations are considered. These data, covering the months of Nov.-Feb., inclusive, are summarized in a table for each season and for the 8-yr. period as a whole. Included are durations and frequency of occurrence of low temps., mean temps. based on "frost nights" alone, and absolute lowest temps. Several temp.-contour charts show graphically some of the information given in tabular form. Other maps present the distribution of temp. on different types of cold nights, while additional charts give averages pertinent in such a report. This survey will be of value not only to persons interested in this area, but to those contemplating frost surveys of other sections.—Philip J. Powell.

17464. JOHNSON, C. G. (London Sch. Hyg. and Trop. Med.) Insect survival in relation to the rate of water loss. *Cambridge Phil. Soc. Biol. Rev.* 17(2): 151-177. 1942.

—The theoretical relationships between longevity (L) rate of water loss (R) and saturation deficiency (S) are examined. If the rate of water loss is directly proportional to saturation deficiency and water loss alone limits survival then longevity is hyperbolically related to saturation deficiency. But when R is not directly proportional to S but is linearly related to it the curve of L against S is hyperbola-shaped although LS is not constant. If water loss alone limits survival then RL is constant no matter how R and L are related to S . The data of various authors from Bacot and Martin (1924) onwards are discussed in detail in the light of the above propositions and in several cases errors in curve fitting of L to S have been found. E.g., the reason for the discrepancy between Leesons and Bacot and Martin's results on rat fleas is partly due to such errors. The method of drawing lines of equal mortality and saturation deficiency across a diagram whose ordinates are temperature and relative humidity is discussed. This method does not demonstrate the true relation between mortality and different saturation deficiencies: for even if temp. is without effect on mortality lines of equal saturation deficiency and mortality will still coincide no matter how these 2 variables are related.—*C. G. Johnson.*

17465. LILLARD, JAMES H., H. T. ROGERS, and JESSE ELSON. Effects of slope, character of soil, rainfall, and cropping treatments on erosion losses from Dunmore silt loam. *Virginia Agric. Exp. Sta. Tech. Bull.* 72. 1-32. 12 fig. 1941.—Erosion losses from Dunmore silt loam, a highly productive soil of the limestone valley region of Virginia are reported in relation to degree of slope, rainfall and cropping treatments. The measurements are probably also applicable to closely associated soils of the Hagerstown and Frederick groups. Data are reported from 2 separate expts. Part I deals with soil and water losses from a 3-yr. rotation of corn, wheat and clover during a 4-yr. period (1937-1940). Measurements were made on natural slopes of 5%, 10%, 15%, 20% and 25%. 3 plots were located adjacent to each other on each of these 5 slopes. From the calculated curves for soil and water losses it was detd. that the av. annual soil loss increased from 3.49 tons per acre on the 5% slope to 17.17 tons per acre on the 25% slope where corn was grown in rotation. Rainfall lost as run-off increased from 2.68 in. to 3.16 in. The annual soil and water losses from the wheat plots were small. The critical slope for growing small grain crops was 25% under the condition of the expt. 80% of the run-off producing rains occurred during May, June, July, and Aug. These rains constituted 74% of the total effective rainfall and included all storms having a 5-minute intensity greater than 2 inches per hour. Part II reports supplementary soil aggregation studies on Dunmore silt loam from a long-time fertility expt. designed to determine the effect of crop, fertilizer, manure, and liming on the physical condition of the soil in a 4-yr. rotation of corn, wheat, clover, and hay. Clover was the only crop under which the soil showed an increase in the % of large aggregates after the application of comm. fertilizer. Applications of manure without lime (pH 5.5) improved the aggregation of the soil under clover but did not significantly affect soil aggregation under corn, wheat, or 2d year hay. Applications of manure with lime (pH 6) increased the % of large aggregates in the soil under all 4 crops in the rotation.—*E. A. Carleton.*

17466. RUEDY, R. (National Res. Lab., Ottawa.) Absorption of light and heat radiation by small spherical particles. II. Scattering of light by small carbon spheres. *Canadian Jour. Res. Sect. A. Phys. Sci.* 20(3): 25-32. 1942.—Spheres of C for which $2a/\lambda$, the ratio between the diam. of the particle and the incident wave-length (λ) is $<$ about 1/10 scatter the light uniformly in all directions. The intensity of the scattered radiations for any angle is proportional to the square of the volume of the particle and inversely proportional to the 4th power of λ . As the ratio $2a/\lambda$ increases from $\frac{1}{2}$ to $\frac{1}{2}$ and greater values, the diffused light collects more and more into a main beam that appears as a continuation of the incident ray and that decreases in width as $2a/\lambda$ increases. Blue light prevails in the scattered radiation. When the size of the particles is unknown, the intensity, distribution, and polarization

of the scattered light give an at least approximate value for the radius.—*Auth. abst.*

17467. SAHNI, P. N. (Rothamsted Exp. Sta., Harpenden, Herts.) The relation of drainage to rainfall and other meteorological factors. *Jour. Agric. Sci.* 31(1): 110-115. 1 fig. 1941.—A restudy of the rainfall and drainage from a 20-inch drain gauge was made covering data secured between 1878 and 1932, by natural drainage periods, i.e., periods between successive cessations of flow, for June, July and August, using all periods of from 2 to 13 days. A curvilinear relationship between the difference of rainfall and drainage deficit was established. No appreciable correlation of residuals with mean air temp. was established, but there was slight evidence that the deficit was increased by a decrease in rel. humidity or an increase in wind velocity. The residuals showed little correlation with drainage during the previous 3 weeks.—*Henry Dorsey.*

17468. SCHULMAN, EDMUND. (U. Arizona.) Variation between ring chronologies in and near the Colorado River drainage area. *Tree-Ring Bull.* 8(4): 26-32. 1 fig. 1942.—75 skeleton plots represent the drought yrs., 1720-1941, in this number of selected groups of conifers from an area of about $\frac{1}{4}$ million sq. miles. These show a great fluctuation in the limits of the area subject to drought in different yrs. Three supersensitive groups of Douglas firs (*Pseudotsuga taxifolia*) show an av. annual change in radial growth, for 221 yrs., of from 60% to 80% of the mean march of growth. One exposed and steep gravel slope 6 miles east of Salida, Colorado, contains spike-topped Douglas firs averaging 12 ft. high, 10-12 in. basal diam., and about 500 yrs. in age; the rings are complacent and there are no cases of locally-absent rings. On a nearby site of different character equally slow-growing but very sensitive firs were sampled; one showed 19 rings locally-absent and 29 rings from 0.01 to 0.10 mm. in width for the interval 1720-1941.—*Edmund Schulman.*

17469. VESIKIVI, ANTTI. Savimaala ja viljellyllä suomaalla sekä ojitetulla ja ojittamattomalla rakkärämällä suoritettujen ilman lämpötilahavaintojen tuloksia. [Air temperature observations over clay soil, cultivated bog and drained and undrained sphagnum marsh.] *Wiss. Veröffentlich. Finnischen Moorkultur.* 18. 1-53. 1941.—Observations from 1925 to 1939 show no striking differences in av. air temp. (Apr. to Sept. incl.) over clay soil and adjacent cultivated bog at corresponding elevation, 0.5 m. Mean max. temp. also similar. Greater differences in av. min. temp., bogs lower. Latest spring and earliest fall frost occurred on bogs. Air temp. observ. in 1936-1939 showed sphagnum swamps colder than cultivated bogs, but min. temp. no lower over undrained marsh than over drained areas and often higher. The data indicated higher air temp. and earlier thawing attributed to higher water table and higher soil-water temp. in the undrained area. Author questions advisability of drainage to improve air temp. conditions over marshes.—*J. E. Kotila.*

ANIMAL

17470. ALLEN, DURWARD L., and WARREN W. SHAPTON. (Dept. Conserv., Lansing, Mich.) An ecological study of winter dens, with special reference to the eastern skunk. *Ecology* 23(1): 59-68. Map. 1942.—A series of 36 ground dens was excavated and studied in Clinton County, Michigan, in Jan. and Feb. 1940. Most of the burrows were dug by woodchucks (*Marmota monax rufescens*), some with subsequent modification by other spp. The av. max. depth was 39.4 in. and the deepest den reached 6½ ft. below the surface. The longest den had a total footage of 56 ft. 4 inches and had 5 openings. No woodchucks were found in the burrows. 5 contained live skunks (*Mephitis mephitis nigra*) with ♂♂ and ♀♀ in the ratios 1:1, 1:2, 1:0, 1:1, and 0:1 respectively. Population was estimated at 2 per hundred acres. Two burrows contained dead skunks entire and fragmentary remains were found in 2. Evidence from dens, box trapping, and mortalities accounted for indicated that many skunks were dying off at the time of the study. This situation appeared to be correlated with a widespread decline of the species in the state. Incomplete evidence from pathology reports indicated that 3 skunks autopsied were infected with an unknown virus.—*D. L. Allen.*

17471. BAKER, C. L. (Southwestern, Memphis.) The

effects on fish of gulping atmospheric air from waters of various carbon-dioxide tensions. *Jour. Tennessee Acad. Sci.* 17(1): 39-50. 1942.—Fish that can gulp atmospheric air have a much better chance of survival than those that are prevented from reaching the surface. Expts. show that fish in waters of high CO₂ tension (13 mm. Hg) remain alive after gulping atmospheric air (0.24 mm. Hg). Surface water fish die in quiet waters when they are prevented from gulping surface air even though there is sufficient O₂ and a minimum of CO₂ present. Sudden changes in the CO₂ tension are not the cause of death of large numbers of fishes in Reelfoot Lake, Kephart Prong Hatchery, Hamble State Hatchery and Norris Lake. Sudden drops in air temp. seem to be a contributing cause of fish mortality.—C. L. Baker.

17472. BARNES, H. F. (Rothamsted Exp. Sta.) Studies of fluctuations in insect populations. IX. The carrot-fly (*Psila rosae*) in 1936-41. *Jour. Animal Ecol.* 11(1): 69-81. 1 pl., 3 fig. 1942.—Collections were made in north Lincolnshire and east Nottinghamshire, England, where the carrot is the only host-plant, in Feb. and early March each yr. From the number of larvae and puparia collected per hr. the pest was most abundant in 1939. The larvae and puparia were raised to emergence of adults in soil from the place where collected. The only parasite collected was *Dacnusa postica*. The time of collecting was found to be the normal period when larvae change to puparia. The % of emergence of adults was high in all yrs. except 1940. Failure to emerge may have been due to a blackening disease. The sex ratio of adults at emergence gave a greater proportion of ♀. The peak of emergence of the greatest number occurs abruptly about May 14 and passes quickly. The % of parasitism was low for all yrs. except 1940. A suggestion is made for establishing an insect phenological station to prepare tables of dates of hatching, emergence, etc., of insect pests for different localities and to provide information each year as to the earliness and lateness of the season to aid in control. Treatment of carrot clamps with formalin soln. is recommended.—S. C. Kendeigh.

17473. COLQUHOUN, M. K. The habitat distribution of the grey squirrel (*Sciurus carolinensis*) in Savernake forest. *Jour. Animal Ecol.* 11(1): 127-130. 1942.—Number of squirrels observed per hr. when walking at 1 m.p.h. during Oct. to June in Wiltshire, England, averaged 2.7, the number observed being higher in winter than when the trees are in foliage. Increasing the walking rate to over 2 m.p.h. increased, as with birds, the number seen per hr. but decreased the number seen per mile. The squirrels showed a preference for beech, *Fagus sylvatica*, over oak, *Quercus robur*, and in pure beech woods showed some tendency to vary inversely in abundance with the jackdaw, *Corvus monedula*.—S. C. Kendeigh.

17474. DAHMS, R. G., and W. M. OSBORN. (U. S. Dry Land Field Sta., Lawton, Okla.) Effect of certain weather conditions on chinch bug abundance at the Dry Land Field Station of the United States Department of Agriculture at Lawton, Okla., 1916-40. *Ecology* 23(1): 103-106. 1942.—Chinch bug [*Blissus leucopterus*] investigations and weather conditions at the Dry Land Field Station of the U. S. Dept. of Agric. at Lawton, Okla., for the 25-yr. period 1916 to 1940 indicate that light chinch-bug infestations occurred in yrs. when the rainfall for the period from July 10 to Aug. 20 of the preceding year was low. Winter temps., winter barley survival, and rainfall during May and June did not appear to be correlated with chinch-bug outbreaks.—Auth. summ.

17475. ELTON, CHARLES. (Bur. Animal Population, Oxford.) Voles, mice and lemmings. Problems in population dynamics. [ii] + 496p. Frontispiece, 8 maps. Oxford University Press: New York, 1942. Pr. \$10.—Population fluctuations of small rodents (*Apodemus*, *Dicrostonyx*, *Lemmus*, *Microtus*, *Mus*, *Pitymys*) are examined. These rodents affect the economics of man and the food supply of many bird and mammalian predators in various parts of the world. The trend of these fluctuations is similar among genera studied. Thus for several yrs. the population is at low level, gradually increases to plague proportions, the human population appeals to local government for relief, the rodents die off suddenly, whether or not steps have been taken to destroy them, the plague is forgotten

while the rodent population recovers for a new cycle of abundance. In France *Bacterium enteritidis* is used in control of the vole (*Microtus agrestis*), but although efficacious if applied in quantities large enough to infect majority of voles, tests were uncontrolled and hence failed to differentiate between demonstrated reduction of vole peak and decline from natural causes. In Germany *Bact. typhimurium* is used in vole control, as well as such poisons as CS₂ and P compounds. An accurate population record kept in Bavaria between 1903-1937 gave vole peaks every 3-5 yrs. This cycle is similar to those of the lemming and vole (Norway), vole (Great Britain), vole (Labrador), and arctic lemming (Canada). In addition to poisons and artificial infection, crops are closely cleared in parts of Russia to eliminate breeding-grounds of mice-like rodents. Research in Russia, Gt. Britain and U. S., indicates that population densities are products of movements, reproduction and mortality. These 3 processes are affected by: 1) predator action and interaction:—Predators especially notable are barn owl (*Tyto alba guttata*) and Siberian hawks and owls in Russia; short-eared owl (*Asio flammeus*) in England; periodic migrations of snowy owl (*Nyctea nyctea*) from Labrador into Canada, and migrations of rough-legged hawk (*Buteo lagopus*) from Norway into England. The predator-prey cycle is partially explained by the Errington-Kalabukhov theory of carrying capacity of cover, in which sudden rise in predation follows as the prey population of rodents overflows normal protective cover. Protective cover for rodents discussed is both shelter and food, and eating of cover by increasing population may cause movement and automatic exposure. 2) Disease important in rodent cycle during population peaks:—The two spp. of *Bacterium* cited will nearly destroy the population but they have not been shown to initiate an epidemic—rather to produce infection of mice by inoculated bait. Sudden population decline may be associated with brain infection by protozoan (*Toxoplasma*) in England, or with tuberculosis (*Myobacterium*). It is concluded that there is no parasite which is the master influence in sudden population decline of mice-like rodents. 3) Senescence:—In *Microtus agrestis* in nature, the population that starts the breeding cycle in spring is replaced by its own offspring the following spring. This checks laboratory colonies, where predation and disease are eliminated, in which it is demonstrated that av. life expectancy at birth is 7.5 months. The population cycle has been especially well studied for rodent genera named in north-western Europe, northern Labrador and Quebec Peninsula (Ungava). The latter especially well documented; it deals with the thesis that the entire welfare of the human population depends on the fur trade (notable here is the fox, *Vulpes fulva*) or upon abundance those mammals used as food. Thus fur trade and food of Indians and Eskimos largely depends on vole-lemming population, either directly as rodent numbers affect numbers of predatory mammals, or indirectly as rodent numbers affect movements and numbers of caribou (*Rangifer arcticus*) in competition for sparse vegetation cover.—The book has a workable index. Each chapter has a separate bibliography, many items of which are in Russian; these Russian articles have been translated into English, and full translations are available at the Oxford Bureau of Animal Population—Orlando Park.

17476. ELTON, CHARLES, and MARY NICHOLSON. (Oxford U.) Fluctuations in numbers of the muskrat (*Ondatra zibethica*) in Canada. *Jour. Animal Ecol.* 11(1): 96-126. 21 fig. 1942.—Analysis of records, chiefly of the Hudson Bay Co. for fur sales and fur returns, together with a questionnaire sent to fur posts, shows that since about 1850 there has been a strongly marked cycle of about 10 yrs. in the numbers of muskrat. This cycle covers a wide geographic range across Canada and runs parallel with a similar cycle in numbers of various terrestrial animals, which would infer that some climatic factor controls these different population rhythms.—S. C. Kendeigh.

17477. FLANDERS, STANLEY E. (U. California, Citrus Exp. Sta., Riverside.) The sex-ratio in the Hymenoptera: A function of the environment. *Ecology* 23(1): 120-121. 1942.—The environmental conditions that may govern the variability of the sex-ratio within a species are briefly

reviewed. The phenomena by means of which such conditions affect the sex-ratio are deuterotoky, differential mortality of the sexes, differential functioning of the spermatheca, and differential deposition or development of haploid and diploid eggs.—S. E. Flanders.

17478. HAMMER, OLE. Om foenologien hos nogle i kogödning levende fluer. [Ecology of some flies inhabiting cow manure.] *Ent. Meddel. [Copenhagen]* 22(1): 13-14. 1940.—Coprocolous flies may be placed in 2 categories—i) spp. appearing at the peak of summer temp. and disappearing with the waning of summer heat (includes *Musca autumnalis*, *Cryptolucilia caesarion* and *Lyperosia irritans*); ii) spp. of which adults appear through the year, most prevalent in pre-summer and post-summer periods, indicating low resistance to high temps. of mid-summer (incl. *Haematobia stimulans* and *Scopeuma stercorarium*). The various species show differences in other adjustments—as in overwintering, in length of period of appearance, and in number of generations per year.—C. E. Olsen.

17479. LACK, DAVID. Ecological features of the bird faunas of British small islands. *Jour. Animal Ecol.* 11(1): 9-36. 1942.—Studies during the breeding season of 1941 on Orkney and other small British islands demonstrate a progressive decrease in the size of the avifauna as the islands become smaller and more remote from the mainland. This is due to a smaller variety of habitats, greater liability to extinction, and to the sea acting as a barrier. The distribution of a species among the islands is often erratic due to local extinction of some small island populations and to the random manner of dispersal. On the smaller islands most land and fresh-water spp. have populations of < 10 prs. each and during the last 100 yrs. have been subject to marked changes in status. In marine spp. these fluctuations have been less pronounced. Some increases in numbers have been due to planting of trees and shrubs, to increase in agric. land, to protection, and in several cases, to the species becoming adjusted to habitats different from those occupied on the mainland. Some decreases in population have been due to elimination of marshes, to human destruction, and to periodic bad seasons. Many fluctuations, especially on small islands, are random and in some cases have occurred without obvious alteration of the environment, possibly due to internal changes within the species.—S. C. Kendeigh.

17480. OSBORN, BEN. (U. S. Soil Conserv. Serv., Weatherford, Tex.) Prairie dogs in shinnery (oak scrub) savannah. *Ecology* 23(1): 110-115. 5 fig. 1942.—The occurrence of prairie dogs (*Cynomys ludovicianus*) in heavily grazed shinnery (*Andropogon-Quercus* scrub) savannah in Roger Mills County, Oklahoma, is reported. This is an example of the invasion and further modification of one biotic community by an important and characteristic animal of another, following modification of the biota by man and his domestic animals. Factors favoring the spread of the prairie dogs from the original mixed-grass prairie inclusions within the shinnery savannah after home-steading of the land by farmers were (1) modification of the dominant vegetation by grazing by domestic stock, (2) reduction in numbers of predatory animals, and (3) reduced food-supply within the original bounds of the colony due to the increase in its own population and grazing by domestic stock. Soil types apparently had little influence upon the local distribution of prairie dogs after the biotic balance was upset. In the presence of continued grazing by domestic stock, the prairie dogs are able to maintain and extend their control over the woody spp. of the shinnery savannah vegetation type.—Ben Osborn.

17481. PICKLES, W. Animal mortality on three miles of Yorkshire roads. *Jour. Animal Ecol.* 11(1): 37-43. 1942.—687 individuals of 42 spp. of mammals, birds, amphibians, worms, insects, and molluscs were killed in a year's time on this heavily traveled country road. Besides being run over, many insects, especially bees, were killed by being thrown onto the ground by the force of air currents produced by the passing car. The maximum deaths occurred in Aug. at the time of greatest traffic and max. animal life. Greatest mortality occurred during the hottest week of the yr. Ants, *Myrmica ruginodis*, dragged bees for food back to their nests at the side of the road. Casualties were greatly reduced where trees bordered the road. Horse

droppings and dead carcasses attracted some insects (flies and *Necrophorus humator*) which normally would not come onto the road. There may be survival of the fittest as the more agile and alert would be better able to get away from the traffic.—S. C. Kendeigh.

17482. RUSSELL, E. S. Biological adaptedness and specialization of instinctive behaviour. *Nature [London]* 147: 729-734. 1941.—Adaptive specialization rules throughout the whole life history of any animal. One aspect of the specialization is the adaptedness of instinctive behavior on the perceptual side. As one example, the author considers in outline the ways in which several insect species contrive to oviposit in the special ecological norm suitable for larval development. He concludes that "each animal species has an innate predisposition to perceive, and act with reference to, particular objects and events, which alone have valence for it." In many cases the suitable object is distinguished by means of only a few of its possible valent characteristics. Because some biologically insignificant objects may possess these same signs, one may expect to find frequent aberrations in instinctive behavior.—N. R. Bartlett (in *Psychol. Abst.*).

17483. STANLEY, JOHN. (Queen's U., Canada) A mathematical theory of the growth of populations of the flour beetle *Tribolium confusum* Duv. V. The relation between the limiting value of egg-populations in the absence of hatching and the sex-ratio of the group of adult beetles used in a culture. *Ecology* 23(1): 24-31. 1942.—The relation between the sex-ratio (ratio of ♀♀ to total number of adults) of adults in a population of the flour beetle *Tribolium confusum*, and the limiting value of the egg-population in the absence of hatching is discussed. The mathematical relation of *R* (the sex-ratio) to the formulations previously described by Stanley [see B. A. 15 (5): entry 10072] is clarified. An equation is derived in the form of ϵ (the limiting value of the egg-population in the absence of hatching) as a function of *R*, and fitted to the exptl. data with good agreement. The effect of re-traversing of old persistent tunnels in the flour, by adults (re-tunnelling) is discussed. The equation has too large a notational background for intelligible summarizing. See Equation (5) of the original paper. In general, it is shown that as *R* increases, the limiting egg population increases, the curve being concave downwards.—John Stanley.

17484. VENABLES, L. S. V., and P. H. LESLIE. (Oxford U.) The rat and mouse populations of corn ricks. *Jour. Animal Ecol.* 11(1): 44-68. 1 pl., 3 fig. 1942.—A survey was made, 1939-41, of the number of rats, *Rattus norvegicus*, and house mice, *Mus musculus*, found at threshing time (Aug.-July) in stacks (ricks) of grain (wheat, barley, oats, beans) in Oxfordshire and Berkshire. Records were obtained from 518 stacks in 266 different groups. During both yrs. the number of rats rose from late summer to a max. the following April and then declined as the rats scattered to fields and hedges. The av. max. number per stack in 1940 was 79 and in 1941 was 45. A higher % of ♀ rats wintering (Nov.-Feb.) in the stacks were pregnant (28%) than of ♀♀ wintering elsewhere (3%). Information obtained on mice was less accurate but indicated them to be an equally serious economic problem. In the same stack, rats tended to concentrate in the upper half and mice in the lower half. Practical recommendations are to thresh as early as possible to prevent a build-up of the population and to kill all rats at the time of threshing to prevent spread elsewhere.—S. C. Kendeigh.

17485. WELLS, WAYNE W. Ecological studies on the pinnotherid crabs of Puget Sound. *Univ. [State] Washington Publ. Oceanogr.* 2(2): 19-50. 1940.—The species observed—*Pinnixa littoralis*, *P. faba*, *P. schmitti*, *P. eburna*, *P. tubicola*, and *Fabia subquadrata*—can live indefinitely without a host. The crabs—*P. littoralis* and *F. subquadrata*—emerge from *Schizothaerus nuttallii* and *Modiolus modiolus* upon the death of the molluscs. Both adult and young crabs attempt to enter new hosts under exptl. conditions. In natural conditions, i.e., on a beach and under water: *P. littoralis* and *P. faba* wander about upon the beach and give no evidence of searching for a host or attempting to dig in; *P. tubicola* dig into the sand if no hosts are present, responding positively to the tentacles of the host worm, *Amphitrite*; *P. schmitti* dig in or enter

holes after a very short time upon the beach; *P. eburna* dig into the beach rather than wander or enter holes. One instance is mentioned of *F. subquadrata* entering a host not ordinarily used. *P. eburna* and *P. schmitti*, commensals with worms, did not stay in clams in which they were placed. All zoea are positively, and all megalops and adults are negatively, phototropic to strong sunlight. *P. eburna* is slightly positive to dim light. The spp. vary in their resistance to high and low temps. Their temp. range lies between 36° and -2°, the freezing point for sea water. The lethal effect in each case depends upon the degree and period of the exposure. Resistance of the crabs to desiccation varies with the conditions under which it takes place. A correlation exists between the carapace width of *F. subquadrata* and its host, *M. modiolus*.—Auth. summ.

17486. WOODBURY, ANGUS M. (U. Utah.) Animal migration—periodic-response theory. *Auk* 58(4): 463-505. 1941.—Literature was reviewed to show that many biological rhythms were correlated with daily, lunar, seasonal or secular periodic events of the environment and that some were behavior-adjustments but others were heredity-responses. Some of the biol. rhythms were expressed as 2-way movements correlated with environmental periodicities (migrations). Seasonal migrations of this type may be expressed as simple wandering, drouth, altitudinal, vertical (aquatic), local, food, anadromous, catadromous, and latitudinal movements. Best developed are the latitudinal migrations which are illustrated by movement from breeding grounds in the Arctic to north temperate areas and back, to tropics and back, to south temperate areas and back, and to the Antarctic and back. Return conditions differ in each area and initiation of return cannot be explained as the result of fluctuating daylength, temp. or food supply. After reviewing theories of migration, it is suggested in the author's new periodic-response theory that migration has arisen many times in many groups of animals by adjustment of behavior to meet environmental periodicities, development by independent hereditary mechanisms of hereditary behavior patterns to supplant behavior adjustment, perpetuating these by natural selection, regulating and moulding these patterns by environmental periodicities and extending or changing the routes when once established. The mechanism by which the periodic responses of animals are produced is suggested as a stable nervous system modified by endocrine secretions which operate periodically. They are probably independent of the gonadal secretions. Orientation and guidance of animals may be a result of mental integration of all sensory material and distance traveled may be determined by quantity of hormone that causes movement. This may be tested in the laboratory by further study of endocrine effects and in the field by exptl. migration by testing the hereditary urge to migrate in many different spp. reared under artificially stabilized environment and by rearing young of migratory birds in new locations far from their ancestral haunts to see if they develop migratory behavior.—A. M. Woodbury.

PLANT

17487. BLAKE, S. T. (U. Queensland.) The vegetation of Running Creek Valley, Southeast Queensland, and some neighbouring areas. *Queensland Nat.* 12(1): 4-12. 1942.—In its lower course, Running Creek is flanked by a broad alluvial plain which narrows upstream to a narrow gorge. The soils vary from brown forest soil on the higher ground to black earths in the valley. The 5 plant community types are: (1) Closed forest, which is frequently true rain-forest though there are few spp. of vascular epiphytes; (2) Open forest, dominated by *Eucalyptus* spp., occurring in the wider part of the valley and on some of the slopes and crests, with canopy broken to fairly continuous and a rich and dense grass-cover; (3) The vegetation of stream banks and beds; there is a definite fringing forest, dominated by *Casuarina cunninghamiana* in the lower part of the valley, changing upstream through flooded gums (*Eucalyptus saligna*?) to rain-forest; (4) A small swamp with four zones, the centre dominated by *Eleocharis equisetina*; and (5) Artificial and induced grassland, chiefly *Paspalum dilatatum* on the lower ground, and *Chloris guyana* on the higher ground.—S. T. Blake.

17488. BONSTEEL, J. A., and T. C. BASS. (Soil Conserv. Serv., U. S. Dept. Agric.) Erosion and related land use conditions in the Conestoga Area, Pa. *Erosion Surv. U. S. Dept. Agric. Soil Conserv. Serv.* 15. 1-52. 2 maps, 16 fig. 1940.—The Conestoga area comprises 632 sq. mi. in Lancaster Co., west-central Pennsylvania and includes all the territory drained by 2 branches of the Susquehanna R., Conestoga and Pequea Creeks and their tributaries. The land has been farmed for more than 200 yrs. Most of it is still in a high state of productivity, although some evidences of soil erosion have appeared. A demonstration project and a camp work area of the Soil Conserv. Serv. of the Dept. of Agric. were established and a voluntary soil conserv. district was organized by the farmers, to make a detailed study of this well-known and progressive farming section. The area is not subject to extreme heat or cold and winters seldom injure winter grains or fruit trees. The av. precipitation of 41-44 in. is so well distr. that crops seldom suffer from drought or excessive moisture. The area was originally almost completely covered with mixed hardwoods, and oak and hickory are still the dominant trees. Today this is a section with a well-balanced agric. and industrial development. In the Conserv. Surv. an inventory was made of the soil, land slope, extent of soil erosion, and existing land cover. 79 soils were found and were placed in 12 groups. Land was classified according to use as cropland, pasture, woodland and idle land. According to erodibility of soils, the slopes were divided into the following 2 groups; (1) soils on the plain, stream terraces, and flood plains, and (2) soils on the upland area. The main purpose of the surv. was to determine the relationship of other factors to the existing conditions of soil erosion. Classes of erosion were set up and descr. and the symbols used in mapping sheet and gully erosion given. The following information is presented for each of the 12 soil groups: locations; parent material; color; associated crops; and percentage of slope, erosion, and types of land. Detailed descriptions of the 79 soil types are included.—N. E. Zink.

17489. CAMPBELL, DOUGLAS H. (Stanford U.) Continental drift and plant distribution. *Science* 95(2455): 69-70. 1942.—A discussion.

17490. CHAPMAN, A. G. (Central States Forest Exp. Sta., Columbus, Ohio.) Forests of the Illinoian till plain of southeastern Indiana. *Ecology* 23(2): 189-198. 2 maps, 7 fig. 1942.—On the Illinoian till plain of s.e. Indiana the old-growth forests had a predominance of beech, sweet gum, and pin oak, but contained enough yellow poplar, white oak, black walnut, black cherry, and hard maple to resemble the mixed mesophytic forest rather than the characteristic upland swamp forest. The % of the latter group of spp. varied directly with quality of drainage, increasing from the very poorly drained Blanchester silt loam to the well-drained Rossmyne silt loam. The ratio of pin oak to sweet gum in these old-growth forests—this is true also of the second-growth forests—increased from south to north. Soils of the Illinoian till plain are in general poorly drained, with high water-holding capacity. The more extensive flats have been found still wet in early Aug. From 20% to 30% of the total area of the Clermont and Blanchester soils on the flats now has a forest cover. Succession of plant cover, beginning with the old-field herbaceous or grassy cover (oftentimes broomsedge) has 3 definite stages: the typical upland swamp forest of sweet gum, red maple, and pin oak; modification of the gum-red maple thickets by establishment of yellow poplar, black cherry, sugar maple, and shagbark hickory; and a composition resembling the original, brought about by development of seedlings of beech and, on the better-drained soils, white oak, hickory, black cherry, and sugar maple. Microrelief to a very great extent controls the composition of the forest stands. Seedlings of beech and mesic spp. germinating on areas where the water-table is at the surface develop only shallow root systems, inadequate for survival through the summer, when the water-table recedes. The Illinoian till plain of s.e. Indiana has a high potential capacity for producing wood volume, which favors profitable management in coordination with agric. land uses. It appears feasible to control the forest stand

composition in part, through cutting methods and through artificial creation of microrelief by furrowing or other land-surface disturbance.—A. G. Chapman.

17491. COOPER, W. S. (U. Minnesota.) An isolated colony of plants on a glacier-clad mountain. *Bull. Torrey Bot. Club* 69(6): 429-433. 2 fig. 1942.—A collection of 15 spp. from a high ridge crest on Mt. Bertha, in the Fairweather Range, Alaska, surrounded by many miles of ice and snow, include 6 with disseminules fitted for transportation by wind. The others have small seeds, except *Lupinus nootkatensis*, which has large ones. Patches of alpine turf were found. Barriers to migration have been more formidable within the last 2-3 centuries than they are today; hence the most easily tenable explanation for the presence of this colony is that there has been a continuous plant population on the slopes of the mountain for a very long time, and that it arrived during a time when glaciation was less extensive than now. Such a period has been demonstrated for the immediate vicinity (Glacier Bay); it occurred 2000 or more yrs. ago. Correlation with the warm-dry mid-post-Pleistocene period of von Post and others is suggested.—W. S. Cooper.

17492. DAUBENMIRE, R. F., and H. E. CHARTER. (U. Idaho.) Behavior of woody desert legumes at the wilting percentage of the soil. *Bot. Gaz.* 103(4): 762-770. 2 fig. 1942.—The wilting % of the soil has essentially the same significance in the water relations of *Prosopis velutina*, *Acacia farnesiana*, and *Lysiloma thornberi* as in wheat. In contrast to wheat, attainment of the wilting % in the legumes is not marked by a wilting of the leaf blades. However, the attainment of the wilting point brings about these changes in the legumes: (a) an essentially concomitant increase in the rate of abscission, (b) deviation from the normal diurnal positions of the pinnules, (c) cessation of shoot elongation, and (d) sharp decrease in the transpiration rate. Apparently the growth and transpiration rates of the legumes continue at approx. normal levels as long as the soil contains any water in excess of the wilting %. As long as the roots of the legumes have access to growth-water, their transpiration rates appear to be closely related to the strength of illumination and to be unrelated to variations in the evaporative power of the air, so long as the latter is not likewise controlled principally by insolation.—R. F. Daubenmire.

17493. DOWNIE, D. G. Notes on the germination of some British orchids. *Trans. Bot. Soc. Edinburgh* 33(2): 94-103. 1941.—Basic expts. on orchid seed germination, whether asymbiotic or symbiotic, should be carried out in water. Orchid seeds which do not germinate asymbiotically in water may be stimulated to develop in this medium by means of a fungus which enters into mycorrhizal association with the adult plant, for example, *Goodyera repens* and *Platanthera bifolia*. An endophyte obtained from one species may initiate the germination of the seeds of another species in water. Symbiotic germination is therefore not necessarily specific. The endophyte of *Habenaria bifolia*, for example, stimulates the seeds of *G. repens* and vice versa.—Auth. summ.

17494. DUGAND, ARMANDO. Estudios geobotánicos Colombianos. Descripción de una Sínequia típica en la sub-xerofitía del litoral Caribe. *Rev. Acad. Colombiana Cienc. Exactas, Fis. y Nat.* 4(14): 135-141. 2 pl. 1941.—An ecological view of the vegetation of the coastal region of the lower Magdalena Valley in Colombia, with tabular enumeration of the main components of the Arboretum, Fruticetum, Fruticuletum, Herbetum, Crassicauletum, Crassirossuletum, Caulirossuletum, Gigantigraminetum, Epiphytetum, and Paraphytetum.—F. W. Pennell.

17495. ELLISON, LINCOLN. A comparison of methods of quadratting short-grass vegetation. *Jour. Agric. Res.* 64(10): 595-614. 4 fig. 1942.—3 methods of quadratting *Bouteloua gracilis* and *Buchloe dactyloides* vegetation—the pantograph-chart, density-list, and point-analysis methods—were tested on 3 typical short grass quadrats, of low, intermediate, and high density. 5 trained observers used each method 4 times on each quadrat, except that the point method was used 6 times. On an average, the methods reflected similarly the marked differences between quadrats, although with differing absolute values. Grass

areas by the chart method tended to be 50% greater than by the other methods. Areas by the list and point methods were similar. The chart method proved generally least consistent and most time-consuming of the 3: its net efficiency varied from $\frac{1}{2}$ to $< 1/50$ of that of the other methods. The list method tended to give the most consistent results: its net efficiency was much higher than that of the other methods, except that the net efficiency of the point method was the greater on the high-density quadrat. Consistent differences between observers were most evident on the quadrat with grass of highest density and most matted habit. Interactions were demonstrated between observers and methods. Inconsistencies, sometimes large, appeared within the work of a given observer. For estimating area of short-grass vegetation on permanent quadrats, the density-list method, carefully standardized, should be applied; the point-analysis method may be used for training and standardizing observers in the list method; the chart method should be reserved for those studies in which the greatest need is a detailed graphic record of the vegetation.—Lincoln Ellison.

17496. FRITSCHI, A. Pflanzensoziologische Beobachtungen in Wirtschaftswaldungen. *Schweiz. Zeitschr. Forst.* 93 (2): 55-61; (3): 84-90. 3 fig. 1942.—The ground vegetation on immature and mature soils in the forests of St. Gallen and Winterthur is compared, with especial reference to the distrib. of "indicator" plants. In forests where the natural vegetation has been disturbed by management, caution is needed in drawing conclusions from indicator plants.—W. N. Sparhawk.

17497. GARDNER, J. L. (Soil Conserv. Serv., Mexican Springs, N. M.) Studies in tillering. *Ecology* 23(2): 162-174. 1942.—In competition studies, using *Festuca ovina*, *Poa alpina*, and *Phleum alpinum*, and *Stipa robusta*, *Koeleria cristata*, and *Elymus canadensis*, tillering was generally greater when competition occurred between plants of the same species than when 3 spp. were involved at the same competition intensity. In liquid cultures, Marquis wheat showed high tillering under conditions of low Ca and phosphate and high Mg, but little response to either K or nitrate. High soil moisture favored tillering in Marquis wheat but depressed it in *Agropyron smithii*. In *A. smithii* high soil moisture favored rhizome production at the expense of tillers. Field cultures of Marquis wheat produced more tillers and roots under an 8-hr. day but less top- and total yield, as measured by dry wt., than under a 13-hr. day. A review of the literature is given, citing 69 references.—J. L. Gardner.

17498. HODGSON, CHARLES WORTH. (Michigan State Coll.) Influence of height and frequency of cutting upon the growth of smooth brome grass, orchard grass, and Kentucky bluegrass. *Univ. Microfilm Publ.* 414. 1-20. 1942. Pr. \$50.—*Bromus inermis* and *Dactylis glomerata* were cut at heights of 1, 3, 6, 9, and 12 inches and at intervals of 1, 2, 4, and 8 weeks in the greenhouse. In the field they were grown alone and in mixtures with alfalfa and were cut from 5 to 7 times per yr. at heights of 1, 3, and 6 inches and twice for hay. The field trials also included plots of *Poa pratensis* and a mixture of bluegrass and white clover. Frequent close cutting in the greenhouse stimulated the growth of forage for a short time but soon resulted in decreased yields of both forage and roots. The other cutting treatments in the greenhouse did not have any marked effects upon the total yield of forage or underground parts. In the field plots, cutting for hay resulted in the greatest seasonal yields of forage; but the plots which were cut at 3 inches outyielded those cut at 6 in. Legumes, by supplying N, stimulated the growth of the grasses. The chemical data indicate that young, rapidly growing grasses, well supplied with N and moisture, are high in crude protein but low in soluble carbohydrates.—From abstract in Microfilm Absts.

17499. JOFFE, J. S. (Agric. Exp. Sta., New Brunswick, N. J.) Climatic sequences of the Post-Wisconsin glacial age as revealed in the soil profile. *Soil Sci. Soc. Amer. Proc.* 6: 368-372. 1941[1942].—A morphologic study of the Colts Neck soil has suggested that it has characteristics of lateritic soils. The age of the Colts Neck soil is difficult to trace since the geology of the parent material is still

obscure. The Montalto soil has formed on weathered basalt during the Post-Wisconsin age. A study of this soil shows that the weathered basalt is of lateritic nature, indicating a subtropical climate sometime after the Post-Wisconsin glaciation. Searching in the Montalto profile the tundra and podzolization effects which followed in succession after the glacial retreat, the probable sequence and duration of climatic types can be suggested. The tundra and podzol type of climate did not last very long. The strong laterization effects indicate a prolonged period of a subtropical type of climate, first the humid variety and followed by the Mediterranean (dry) variety. In terms of yrs. the following appears to be probable: 3000-4000 yrs. for the presubtropical climate, 3000-5000 yrs. for the present-day climate, which leaves 11000-14000 years for the subtropical climate.—J. S. Joffe.

17500. MALME, G. O. Die Queimada—Pflanzen Matto-Grossos. *Ark. Bot.* 29A(5): 1-15. 5 fig. 1937.—"Queimada" in Brazil signifies a burned plain. 65 spp. of seed plants of a queimada in Matto Grosso province are descr. with particular regard to growth form. Thickened rhizomes and root tubers are common. Various leaf types are descr., many of which are not extremely xeromorphic; 4 show extreme leaf reduction; and many plants begin growth and flowering just before the beginning of the rainy season, due probably to the direct stimulus of fire.—W. A. Anderson.

17502. OLMS TED, CHARLES E. (U. Chicago.) Growth and development in range grasses. II. Early development of *Bouteloua curtipendula* as affected by drought periods. *Bot. Gaz.* 103(3): 531-542. 1942.—Seedlings of *Bouteloua curtipendula* in 2-gallon glazed crocks, grown under wet to dry conditions as regulated by watering at intervals of 3, 6, 12, or 20 days, were subjected to soil-drought periods from 48 to 88 days in length. Plants in the first 3 series were subjected to drought when 18, 30, and 42 days old, and in the last at 26 and 46 days. Watering was resumed in some pots of each series after 48 days of drought, at intervals of 3 and 12 days. Others were left on drought until approx. 110 days old and were then watered amply to test survival. All plants were harvested at 119 days, except those harvested at the beginning, at the close, and 3 days after the close of the 48-day drought. The few seedlings which failed to survive the 48-day drought, and many of the larger number failing to survive for longer periods, had failed in establishment of adventitious roots, either because of having been placed on drought prior to, or just at, the time of initiation of such roots, or because infrequent watering prevented their establishment. Such establishment seemed to be dependent upon 3 consecutive days of soil surface wetness. A few small plants, however, survived 48 days of drought with no established adventitious roots. All stem meristems nearest the ground, and the young foliage surrounding them, were equally and most resistant to the effects of internal water deficit, resuming growth rapidly after watering. Older foliage died during the 48-day drought period. Initiated adventitious root primordia, buried in stem tissues, either died or failed to grow effectively after subjection to 2-3 weeks of water deficit. Many root tips, established in the soil, had apparently survived but resumed growth very slowly after drought, in contrast to stem meristems. There was little differential effect of drought at different ages on the growth produced by all stem meristems which survived. At 119 days, numerous growth measurements were correlated closely with total amt. of water supplied during the entire expt. In general, size was reduced by drought more than were numbers of organs differentiated, at least in the 48-day period, as compared with continuously-watered controls. Drought, when it prevented establishment of adventitious roots, tended to stimulate the initiation of root primordia on the various axes, both by acceleration of rate of initiation and by increase in total numbers produced on an axis, after watering was resumed.—C. E. Olmsted.

17503. RIGG, G. B. (U. Washington, Seattle.) A raised cattail-tule bog in Yellowstone National Park. *Amer. Midland Nat.* 27(3): 766-771. 1942.—A raised cattail-tule bog has developed east of Yellowstone Lake between a flat sagebrush desert and the base of a steep hill whose dry soil supports only a sparse vegetation. It is due to subterranean water (springs), and to barriers of solid material

at the front and ends. It rests on blue clay. Its max. depth is 10 feet.—G. B. Rigg.

17504. SCULLY, NORBERT J. (U. Chicago.) Root distribution and environment in a maple-oak forest. *Bot. Gaz.* 103(3): 492-517. 20 fig. 1942.—Study was made of the relationships of the Bellefontaine silt loam soil profile, with all its inclusions, to the root development of the native spp. in the maple-oak forest at Wychwood, Lake Geneva, Wisc., during the summers of 1938, 1939, and 1940. Stations were selected so as to obtain a cross-section of the varying conditions within the woodland. 16 station-types were investigated by the trench method of root-distribution sampling. Root-ends were mapped on vertical profiles by size classes. In 6 of the station-types a new, square method of trenching afforded more accurate measurement of the heterogeneous root distribution evident throughout the woodland than did the rectangular trenches most commonly employed. Square trenches were 4×4 ft. The area charted on each wall was 3 ft. long and to the depth of the trench. Rectangular trenches were $7\frac{1}{2}$ ft. long and $2\frac{1}{2}$ ft. wide. The area charted was 6 ft. long, to the depth of the trench, and on the long wall nearest magnetic north. Greatest conc. of the smallest roots, 0-1 mm. in diam., was noted in the A_1 horizon, indicating location of much of the water-absorbing surface. On a root number and % root area basis, the specific horizons generally showed successive decrease in suitability for root development. Areas with dearth of ground cover showed low root numbers and comparatively high percentage root areas. Stations with abundant ground cover were characterized by larger root numbers and smaller percentage root areas. Root vol. samples were approx. equal to that found in the adjacent grassland regions. Earthworm and cicada activities, particularly the former, play important rôles in the soil environment.—N. J. Scully.

17505. SEARS, PAUL B. (Oberlin Coll., Ohio.) Forest sequences in the north central states. *Bot. Gaz.* 103(4): 751-761. Map. 1942.—15 postglacial pollen profiles from bogs in Illinois, Indiana, Michigan and Ohio are figured, of which 13 were previously unpublished. With one exception, in northern Michigan, all are in the central deciduous region. Due to differences in sedimentary history, drainage and fire, not all bogs represent the same time span. However, 4 correlative levels have been established for the series, 1 or more of which is exhibited by each profile. These are as follows: IV. Oak-hickory maximum; III. Beech maximum; II. Pine-(oak) maximum; I. Spruce-fir maximum. The shift from spruce-fir to pine indicates decreasing mesophytism and, following Cowles, is designated as a retrogression. This is true of the subsequent shift from beech to oak-hickory. These 2 periods of retrogression in postglacial time are believed to represent periods of relatively less humid climate and are considered adequate to account for relicts of continental vegetation in the central deciduous region. Of the 15 profiles, 3 exhibit a 2d increase of beech following the oak-hickory maximum, but this is apparently not general.—P. B. Sears.

17506. SIMONSON, ROY W. (Agric. Exp. Sta. Ames, Iowa.) Studies of buried soils formed from till in Iowa. *Soil Sci. Soc. Amer. Proc.* 6: 373-381. 2 fig. 1941[1942].—A light colored band, interpreted as the A_2 horizon of a buried profile, appears in several exposures of Kansan till underlying Peorian loess in southern Iowa. In some exposures it is possible to find the entire profile of the buried soil, including a shallow A_1 horizon, a light gray and platy A_2 horizon, a heavy-textured and darker colored B horizon with distinctly blocky structure, and a C horizon of leached and oxidized till. Field studies of the morphology of these buried soils and laboratory studies of base exchange capacity and clay mineral nature indicate that the buried profiles are members of the Planosol groups, some formed under grass and some under forest vegetation. The similarities between the buried soils and Planosols now at the land surface indicate that climate and prevailing vegetation on the Kansan till plain were like those of the present age.—R. W. Simonson.

17507. SMITH, RICHARD M. (Agric. Exp. Sta., Morgantown, W. Va.) The vegetation pattern on several well-established contour furrow systems in West Virginia. *Soil Sci. Soc. Amer. Proc.* 6: 488-491. 1941[1942].—Vegetation

counts by an inclined-point quadrat method were made on 11 sets of 4- and 5-yr-old contour furrows in pastures in 4 scattered areas of W. Virginia. A consistent pattern of vegetation was found, consisting of (a) denser vegetative cover, more white clover (1), and *Dactylis glomerata* (2) on the furrow bottoms; (b) thinner vegetative cover, less clover, and more *Poa compressa* (3) on the ridge below the furrows; (c) somewhat thinner vegetation immediately below the ridge than midway between furrows. The av. effect of the furrows amounted to a detriment of 5-10% in pasture herbage. The vegetation indicates that the furrow bottom is the most moist and the ridge the driest area, with the remainder of the pasture little influenced. Erosion from the ridge causes some thinning of the vegetation immediately below.—R. M. Smith.

17508. SMITH, RICHARD MERIWETHER. Some effects of black locusts and black walnuts on southeastern Ohio pastures. *Soil Sci.* 53(5): 385-398. 6 fig. 1942.—Studies of established black locusts (*Robinia pseudoacacia*), black walnuts (*Juglans nigra*), and other trees in pastures in s.-e. Ohio indicate that poor pastures are usually improved in species, yield, and composition by the presence of widely spaced black locusts or black walnuts. Other trees are generally less favorable. The protein content of grasses is increased by the N-fixing black locust. Evaluation of the outstanding factors involved indicates that the effect of trees in pastures is complex, no single factor being consistently dominant. By considering the various characteristics of particular tree species and the condition of the pasture and the soil it seems possible to predict with reasonable accuracy the net effect of trees on pasture in a particular situation.—R. M. Smith.

17509. TIMMONS, F. L. (Fort Hays Branch, Kansas Agric. Exp. Sta., Hays.) The dissemination of prickly pear seed by jack rabbits. *Jour. Amer. Soc. Agron.* 34(6): 513-520. 2 fig. 1942.—From studies of the occurrence of prickly pear cactus (*Opuntia macrorhiza*) seeds in the droppings of jack rabbits (*Lepus californicus melanotis*) in and near a cactus infested pasture at Hays, Kansas, in 1940 and 1941, and from germination tests of the seed, it was concluded that jack rabbits are important agents in the dissemination of viable prickly pear seed through western Kansas pastures.—F. L. Timmons.

17510. VAN OVERBEEK, J. (California Inst. Tech., Pasadena.) Some physiological aspects of the problem of ecology and evolution. *Amer. Nat.* 76(762): 23-24. 1942.—An abstract of a paper presented before the Ecological Society. The development of the root system in the course of evolution was discussed.—J. van Overbeek.

17511. WEAVER, J. E. (U. Nebraska.) Competition of western wheat grass with relict vegetation of prairie. *Amer. Jour. Bot.* 29(5): 366-372. 5 fig. 1942.—An outstanding change resulting from the long period of drought has been the shifting of grass dominants in true prairie from the more mesic to the most xeric. Western wheat grass (*Agropyron smithii*), which was formerly of little importance in the eastern third of Kansas and Nebraska, has invaded hundreds of sq. mi. of drought-stricken prairies and native pastures. This perennial, sod-forming grass migrates rapidly by means of long, slender, much-branched rhizomes. This is in sharp contrast with its bunch-forming competitors. The early luxuriant growth, when water is available, results in greatly reducing the amt. of soil moisture for use by other spp., most of which begin development 4 or more weeks later. Lack of much debris under wheat grass results in high runoff and slow infiltration of water, thus further decreasing water content of soil and hindering deep penetration of roots. Competition for water has resulted in great dwarfing and often in wilting and death of most other prairie grasses and forbs. Side-oats grama (*Bouteloua curtipendula*) competes with wheat grass on equal terms only when a dry, early spring delays growth of the invader. Blue grama (*B. gracilis*), a very xeric but low yielding grass, is more resistant to drought and sometimes replaces the wheat grass. Wheat grass is of much less value for grazing or hay than the bluestems (*Andropogon*) and other spp. it has replaced. The large area of true prairie and native pastures now dominated by western wheat grass and the harmful effects of its severe competition for water present a problem

of much scientific interest and great economic importance.—J. E. Weaver.

OCEANOGRAPHY

(See also Entries 17452, 17526)

17512. BASSINDALE, R. (Bristol U.) The distribution of amphipods in the Severn Estuary and Bristol Channel. *Jour. Animal Ecol.* 11(1): 131-144. 2 fig. 1942.—*Gammarus pulex* is a species which is intolerant of dissolved salt or of a pronounced tidal rhythm when in competition with other species, and it does not penetrate far into fresh-water at the head of the estuary. *G. duebeni* lives in water of low salinity but tolerates salinities up to 20 or 25 gm. per l. It occurs from the zone of tidal fresh water, through the transition zone, into water which is nearly always brackish. Here its distribution overlaps the next species. *G. zaddachi* lives in salinities below 28 gm./l. and so extends from the zone which is not permanently fresh, i.e., from the zone of maximum penetration of salt water, to a point near the mouth where it is replaced by the next species. *G. locusta* lives in waters of salinity greater than 28 gm./l. and so occurs near the mouth only. *Marinogammarus marinus* occurs at mean tide level and lives in zones where the salinity does not fall below 10 gm./l. It extends from the mouth to a point somewhat below the seaward end of the *G. duebeni* zone. Near the mouth it may be replaced by *M. obtusus*, which is believed to be a markedly stenohaline species.—From auth. summ. by S. C. Kendergh.

17513. HARDY, A. C. (Univ. College, Hull.) Continuous plankton records: General introduction to the 1938-39 survey. *Hull Bull. Marine Ecol.* 2(7): 1-17. 1941.—The extended survey, in which 7 new lines across the northern North Sea were added to the 3 or 4 in the southern, is descr., organization, personnel, and methods being outlined, and a table gives route, date, time and number of record, mileage, miles per section of recorder silk, wind, sea, and weather, for the period up to the cessation of work at the outbreak of war. The time of daylight and darkness is shown graphically for each run on maps arranged to show routes run each month from January 1938 to August 1939. An additional line crossing the Faroe-Shetland channel on the way from Sule Skerry to Iceland provided 6 runs between April and Aug., 1939.—E. S. Deevey.

17514. LUCAS, C. E. (Univ. Hull, Leith, Edinburg 6.) Continuous plankton records: Phytoplankton in the North Sea, 1938-39. I.—Diatoms. *Hull Bull. Marine Ecol.* 2(8): 19-46. 1941.—This bulletin extends the observations of Bull. 3 to include the northern North Sea, the 6 additional lines having been begun in 1939. Variations in temporal and spatial distr. of diatoms resemble those of 1932-37, and are shown as before on a series of monthly maps for the diff. spp. Further evidence of patchiness, interrelationships, and water movements emerges. General discussion is deferred until zooplankton and hydrography can be presented; certain general tendencies are tentatively pointed out, viz.: the northern diatoms were more abundant in 1939 and the southern ones in 1938; on the whole the southern crops have decreased since 1935-37. It is suggested that the cycle of growth apparent during the whole period of the survey is in the phase of regression, and that the cycle is associated with the strength of pressure of southern water through the English Channel.—E. S. Deevey.

17515. RAE, K. M., and J. H. FRASER. (Univ. College, Hull.) Ecological investigations with the continuous plankton recorder: The copepoda of the southern North Sea, 1932-37. *Hull Bull. Marine Ecol.* 1(4): 171-238. 1941.—Part 1 deals with copepoda as a whole, based on traverses of the silk from the recorder roll; Part 2 discusses the indiv. spp., with the exception of *Calanus finmarchicus*, reserved for a later report. The indiv. counts were made on the material scraped from the rolls and preserved in vials. Limitations in the method as they apply particularly to copepods are discussed, largely by ref. to the results of more orthodox sampling methods. The most striking feature of the distr. of total copepoda is the variation in abundance from yr. to yr.; this is thought to be sufficient to govern the success or failure of various commercial spp. of fish. Study of the component spp. shows the group *Paracalanus* + *Pseudocalanus* to have been by far the

most abundant, and these spp. together with spp. of *Temora* and *Acartia* were responsible for most of the fluctuations in the population. The generalized seasonal sequence is as follows: in winter there is a low, evenly distr. pop. in the area, with a band of greater density off the Dutch coast, presumably accumulated there by SW winds; several northern spp. are found in the area only in winter. In spring and summer the pop. increases in the whole area, usually beginning over the Dogger Bank, and spreading S and W. The pop. declines in autumn. Important qualitative variations were found from yr. to yr., and some of the spp. involved could be regarded as indicators of northern vs. southern water. The results are compared with the findings of the Int. Council survey of 1902-1908, and some marked disagreements are pointed out. Full discussion of the ecology of the region is deferred until later reports.—E. S. Deevey.

17516. RUEDY, R. *Illumination and visual range under water*. 32p. 3 maps. National Research Council of Canada: Ottawa, 1942. Pr. \$25.—In the North Atlantic and Pacific oceans, the average value of the fraction of light lost per meter of depth amounts to 0.04 on the high sea, 0.07 over the continental slope, 0.12 on the continental shelf and 0.3-0.4 a few miles off shore. Wave-lengths in the blue-green (near 5000 Å) are least absorbed. A white sphere 1.4 m. in diam. disappears from sight at a depth of 40-45 m. on a bright, calm day in the clearest ocean water; if painted dark marine blue, it disappears from view at a depth of about 30 m. In the clearest ocean water the visual range up or down does not exceed 30-45 m. Red vanishes at 6 m. and orange at about 60 m. The subsurface illumination falls to one-thousandth of the surface intensity at a depth of 60 m.; below this depth vision is no better than it is above the water before sunrise or after sunset.—*Chancey Juday*.

LIMNOLOGY

(See also Entries 17533, 19056)

17517. BERSING, OTIS S. (*Wisconsin Conserv. Dept.*) *Notes on a typical northeastern Wisconsin lake*. *Wisconsin Conserv. Bull.* 5(8): 3-9. 1940.—Big Bearskin lake, a glacial lake, was originally surrounded by giant white pine and hardwoods. Beaver, mink, otter, fisher and other fur-bearing animals were abundant. Muskellunge, northern pike, bass, and several spp. of pan fish were native. The lake itself is about 565 acres in area, located in Oneida Co. It now has a miscellaneous forest cover of white birch, maple, spruce, some northern pine, and oak with poplar being predominant. Water analysis shows sufficient oxygen. Summer temps. range from 68 to 74 degrees. The water is medium hard and rich in dissolved mineral materials. There are sufficient aquatic plants to supply all needs. Wall-eyed pike is the most abundant fish representing 48.65% of a season's catch with crappies ranking 2d representing 17.5% of catch.—*Herbert McCullough*.

17518. BRINLEY, FLOYD J. (*U. S. Publ. Health Serv., Cincinnati, Ohio.*) *The effect of the sewage from Nashville upon the plankton population of the Cumberland River*. *Jour. Tennessee Acad. Sci.* 17(2): 179-183. 1942.—The phytoplankton population above Nashville averaged < 500 ppm. and the dissolved O₂ was 10 ppm. The plankton volume showed a sudden increase below Nashville reaching a max. of 8,200 ppm. at Crees Ferry one mile below Nashville. The plankton population gradually decreased below Crees Ferry to about 100 ppm. at Dam C, 80 miles below Nashville.—*F. J. Brinley*.

17519. BUEN, FERNANDO de. *Las variaciones físicas y químicas de las aguas del lago de Pátzcuaro (St. X) desde Octubre de 1939 a Marzo de 1941*. *Invest. Est. Limnol. Pátzcuaro*. 7: 1-25. 6 fig. 1941.—Physical and chemical studies of the lake water were made from Oct. 1939 to Mar. 1941. Mean temp. of the air ranged from a min. of 12° C. in Jan. to a max. of 22.8° in June; the amplitude of the daily change was from about 0° to 30° on Dec. 31, 1940; during the same period the change in the temp. of the surface water was 12° to 15°. The temp. of the surface water is highest in June, July and Aug. and reaches a min. in Jan. The transparency varied from 0.7 m. in Aug. to 1.9 m. in Jan. Where the depth was 15 m., the temp. ranged from 19° at the surface to 14.5° at 12.5 m.; the O₂ from 7.2 cc/l

at the surface to 4.8 cc/l at 12.5 m. At the surface the O₂ varied from 4.5 cc/l in Sept. to 7.1 cc/l in Feb. The surface pH ranged from 8.6 to 8.9; P.O₂ was 2 mg/l, SiO₂ 6 to 12 mg/l, and nitrate N 2.4 mg/l.—*Chancey Juday*.

17520. BUEN, FERNANDO de. *Dos cortas campañas limnológicas en el lago de Pátzcuaro (Febrero y Julio de 1941)*. *Invest. Est. Limnol. Pátzcuaro*. 10: 1-16. 11 fig. 1941.—This report deals with special studies of the distribution of temperature, pH and dissolved O₂ in the upper 5 m. at 13 stations in L. Pátzcuaro in Feb. and July, 1941.—*Chancey Juday*.

17521. CHANDLER, DAVID C. (*Ohio State U.*) *Limnological studies of western Lake Erie. II. Light penetration and its relation to turbidity*. *Ecology* 23(1): 41-52. 1942.—Several times each month for a year penetration of daylight into the waters of western L. Erie was measured with a Weston photronic cell. Concurrently with light measurements were detns. of turbidity, amt. of organic and inorganic suspended matter, and the quantity of phytoplankton. Light penetration and the degree of turbidity show an inverse relationship, and the max. depth to which 1% of the surface light penetrated was 9.7 m. when turbidity was 5 ppm., while the minimum was 0.8 m. when turbidity was 115 ppm. In general transmission of light was highest during winter and early summer and lowest during late summer and autumn. Transmission was most uniform vertically when stormy conditions prevailed and least uniform when relatively calm conditions followed stormy periods. Turbidity in these waters is due primarily to materials derived from the bottom sediments; the inorganic component of which is present in larger quantities than the organic component. Biologically, turbidity through its effects on light penetration into this body of water is believed to influence: composition, size, duration, and time of occurrence of phytoplankton pulses; rate of photosynthesis at various depths; position of the compensation point of higher aquatic plants and phytoplankters; vertical distribution of microcrustacea; and magnitude of the commercial catch of saugers (*Stizostedion canadense*).—*D. C. Chandler*.

17522. LINDEMAN, RAYMOND L. (*U. Minnesota*) *Experimental simulation of winter anaerobiosis in a senescent lake*. *Ecology* 23(1): 1-13. 1942.—Benthic ooze from a senescent lake was studied under simulated conditions of winter anaerobiosis at 0°, 5° and 10° C for 120 days, with respect to survival of macro- and microorganisms and variations in their chemical environment. Results were correlated with winter survivals in the lake itself. The organisms were more resistant to extended anaerobiosis at 0° and 5° than at 10°. Specimens of *Chaoborus*, *Chironomus*, *Palpomyia* and *Tubifex* were able to survive 120 days of anaerobiosis in mixed populations at the lower temps. The 3 most common spp. of *Chironomus* showed the following order of tolerance: *plumosus* > *decorus* > *lobiferus*. Microbenthic organisms gradually disappeared with extended anaerobiosis; certain colorless flagellates appeared to be most resistant. The results indicated that none of the organisms studied are able to endure anaerobiosis indefinitely, with the possible exception of certain colorless flagellates.—*R. L. Lindeman*.

17523. LOOSANOFF, VICTOR L., and JAMES B. ENGLE. (*Fish. Biol. Lab., Milford, Conn.*) *Use of complete fertilizers in cultivation of microorganisms*. *Science* 95(2471): 487-488. 1942.—Commercial agricultural fertilizers (complete formulas) have been found well adapted for growing rich cultures of plankton, for use in studies on the physiology of feeding of oysters.—*M. A. Raines*.

17524. UNDERHILL, A. HEATON. *Acidity variations in New Hampshire fresh waters*. *Bull. Fox Res. Forest New Hampshire Forestry and Recreation Dept.* 4: 1-9. Map. 1939.—A study was made of certain ponds and streams in New Hampshire to determine the effect of various types of forest cover on H-ion conc. No correlation was found between forest type and the H-ion conc. In general when streams flowed rapidly over a rough bed, the pH was raised, being usually 6.2-6.9. In relatively stagnant water and where a muck bottom or decaying vegetation was present the pH decreased to 5.7-6.1. Increase in pH can be explained by the loss of CO₂ through aeration or photosynthetic decrease to accumulation of CO₂ as a result of org.

decay. In recently constructed artificial ponds, high acidity was probably due to CO_2 resulting from decay of unremoved muck and vegetation. The unfavorable conditions for fish life, indicated by the low pH readings, improved as decaying material became decomposed. This process can be accelerated by care in selection and preparation of the pond site before flooding.—Auth. summ.

17525. UTTERBACK, CLINTON L., LYMAN D. PHIFER, and REX J. ROBINSON. (U. Washington, Seattle.) Some chemical, planktonic and optical characteristics of Crater Lake. *Ecology* 23(1): 97-103. 1942.—The following observations were made on Crater Lake on July 18, 1940. The water temps. decreased from 15.39°C at the surface to 3.65°C at 425 m. Dissolved O_2 , CO_2 and carbonate were essentially the same as found by Kemmerer in 1913. A pH of 7.5, soluble phosphate of 0.014 mg. P per liter and silicate of 8.5 mg. Si per liter were characteristic from surface to bottom. Organic P had a maximum value of 0.009 mg. P per liter at 100 m. and was almost absent below 200 m. The distribution of these constituents was related to that of the plankton. The plankton count gave a value of 1000 cells per liter in the surface and the bottom layers of the lake and a max. value of 3,250,000 cells per liter at a depth of 75 m. The vertical extinction coefficients as defined by "k" in the equation $I=I_0e^{-kx}$ varied from 0.311 per m. for a red portion of the spectrum to 0.033 per m. for a band in the blue portion. From a consideration of the sizes and the refractive indices of the plankton and the small irregular pieces of volcanic glass together with the extinction coeffs. an explanation of the color of the lake is proposed. The illumination on a submerged horizontal surface was 11.5 ft.-candles at a depth of 120 m. when the surface illumination was approx. 9600 ft.-candles.—Authors.

WILDLIFE MANAGEMENT—AQUATIC

(See also Entries 17517, 17662, 18690, 18782, 19050, 19198)

17526. CHENG, C. (Univ. College, Hull.) Ecological relations between the herring and the plankton off the north-east coast of England. *Hull Bull. Marine Ecol.* 1(5): 239-254. 1941.—430 plankton samples taken by several herring drifters by means of the Hardy plankton indicator (not the continuous plankton recorder) in the Shields fishery area between 1931 and 1938 were analyzed to show the main changes taking place in the plankton. Comps. are made for 29 10-day periods with stomach analyses of herring taken by drifters in the same area and published by Savage; in addition 6 10-day periods are available during which plankton samples and stomachs were taken by a single drifter. The results show that the herring captures certain organisms individually; *Calanus* and *Temora* in the stomachs either corresp. fairly closely to the props. in the plankton or occur in much higher props.; *Anomalocera* was always captured selectively; *Acaria*, *Oithona*, cladocera, and lamellibranch larvae appear to be avoided; when *Calanus* was very scarce in the plankton the numbers of *Limacina* and *Sagitta* in the plankton and stomachs corresp.—E. S. Deevey.

17527. GALTSTOFF, PAUL S. (U. S. Fish and Wildlife Serv.) Accumulation of manganese and the sexual cycle in *Ostrea virginica*. *Physiol. Zool.* 15(2): 210-215. 1 fig. 1942.—Ripe ovaries are the organs richest in Mn, containing 51-59.6 mg. per kilo of dry wt. Testes are poor in Mn, containing only 4.63-7.25 mg. per kilo. The gills have rather high content (17.1 mg. in winter to 38.6 mg. in summer). Analyses of mantle made in the fall just after spawning and in Jan. showed a fluctuation from 8.71 mg. per kilo in winter to 14.2-17 mg. in Sept. In the adductor muscle only a small amt. of Mn can be found throughout the yr. (3.61-9.27 mg. per kilo). The large difference in the Mn content of testes and ovaries is probably due to the much greater proportion of nuclear material in the sperm and the predominance of cytoplasm in the eggs; this suggests that the Mn may be accumulated primarily by the cytoplasm. The peaks of the Mn curve coincide with the periods of max. gonad development and sexual activity of the oyster. Gonad development is continuous, beginning late in fall or early in winter after a complete reabsorption of the unspawned eggs or sperm, and proceeding throughout the winter; the onset of warm weather in May and early in June ac-

celerates the propagation of sex cells, and full gonad ripeness is reached about mid-summer. Upon shedding the greater part of the eggs and sperm, the body of the oyster shrinks, the sex cells which may have remained in the follicles are rapidly absorbed by the invading phagocytes, and the sex gland enters into an indifferent phase, in which the sex of the mollusk cannot be recognized. This after-spawning period is accompanied by a rapid loss of Mn. A low Mn level is continued throughout the hibernation period, when oysters cease feeding. The observed seasonal fluctuations in the conc. of Mn in samples of the oyster population of Long Island Sound seem to be primarily due to the accumulation of Mn by the ovaries. Gills seem to be the other organ which stores this metal in quantities greater than those found in the other parts of the body. In summer the gills of the ♀, as well as of the ♂, have high Mn content (35.1 and 38.6 mg. per kilo of dry wt., respectively); in winter the Mn content of the gills decreases to about $\frac{1}{2}$ its summer level.—The significance of Mn in the physiology of the oyster is not clear: as a catalyst it may play a rôle in the storage and utilization of glycogen. Its effect on the development of the gonads and on sex change in the oyster is now being studied experimentally.—From auth. summ.

17528. JONES, LOWELL L. An introduction of an Atlantic crab into San Francisco Bay. *Proc. Sixth Pacific Sci. Congr.* 3: 485-486. 1939(1940).—The small crab *Rhithropanopeus harrissi* is believed to have been introduced into San Francisco bay with oyster spat from the Atlantic coast. A discussion is given of the environmental factors that may limit its distribution on the west coast.—F. A. Davidson.

17529. KING, WILLIS. (North Carolina Div. Game and Inland Fisheries.) Trout management studies at Great Smoky Mountains National Park. *Jour. Wildlife Management* 6(2): 147-161. 4 pl. 1942.—Creel census studies were made on trout streams in Great Smoky Mts. Natl. Park in 1938, '39, and '40. The catch of legal-sized trout varied from 146 to 1,167 per mile. The average catch varied from .52 to 1.32 fishes per hour. On one stream, Little River in Tennessee, described as typical, the catch was raised from 471.5 to 1,167.5 per mile by releasing legal-sized fishes. The av. length of the legal-sized trout taken in the several streams studied was fairly consistent, ranging from 8.2 to 8.9, except from Abrams Creek where the average was 9.8 in 1940. This stream had limestone water and abundant fish food and showed the possibilities of stocking tributaries with fingerling rainbows. Brook trout were unable to compete successfully with rainbows in most instances and made up a small % of the total catch. Growth data obtained from weights and studies of scales indicate that wild trout reach a length of 7 to 8 inches and have an av. wt. of 2.4 ounces during the third summer. Most rainbows were found to reach sexual maturity by their 3d birthday. Difficulty was found in determining the age of brook trout by the conventional method of scale analysis. A single size limit of 7 inches on all trout is recommended as a desirable management regulation.—Willis King.

17530. LOOSANOFF, VICTOR L., and JAMES B. ENGLE. Use of lime in controlling starfish. *U. S. Fish and Wildl. Serv. Res. Rept.* 2. 1-29. 2 pl., 1 fig. 1942.—The starfish (*Asterias forbesi*) is one of the most destructive enemies of shellfish on the Atlantic coast of N. America, the extent of its damage to the oyster industry of Long Island Sound alone being estimated at \$500,000 a year. Efforts to eradicate this pest, though made for at least a century, have been largely unavailing. The method here presented of combating starfish suggests the use of quicklime, the destructive effect of which is produced by direct contact. Particles of the chemical spread over oyster beds quickly sink to the bottom, and, falling on the starfish, are imbedded in the delicate skin. The caustic action of slaking lime disintegrates the membrane, and the lesions rapidly increase in size. After several days the wounds penetrate the body wall and expose the internal organs. Death usually follows in a short time. Once spread over the oyster beds, the lime retains its effectiveness for some time. Starfish not hit directly by the descending particles will eventually come in contact with them when crawling along the bottom. In the course of time their lower surfaces will become affected and disintegration will begin. The cheapness of lime, the simplicity of its

application, and its comparative harmlessness to oysters and many other commercial species all indicate that it is a practical weapon for use against the inroads of starfish on oyster beds.—Auth. abst.

17531. MacKAY, DONALD C. G. The Pacific edible crab, *Cancer magister*. *Fish. Res. Bd. Canada Bull.* 62. 1-32. 19 fig. 1942.—Sexual maturity probably occurs in ♀♀ at a carapace width of about 4 in., in ♂♂ at 5-6 in. Mating takes place Apr. to Sept., egg bearing—Oct. to June, hatching—Dec. to June (peak in Mar.), megalops larval stage—May to Sept. (peak during July and Aug.). In Boundary bay, megalops occur chiefly during July and Aug., 1st post-larval stage during Aug., 2d during Aug. and Sept. and 3d during Sept. to Nov. During summer and autumn growth is rapid, moults frequent and size increase large. Crabs of all sizes appear to moult in the spring, autumn moulting occurring chiefly among 2- to 3½-in. individuals. The % increase per moult is greatest in young crabs (40% at body width of ½ in.), declining equally among ♂♂ and ♀♀ up to time of sexual maturity (ca. 4 in.), thereafter less in ♀♀ (8-10%) than in ♂♂ (15%). Intervals between successive moults increase with age. During the 1st 5 post-larval stages an increase from 11 days to 34 days was observed. Large nos. of crabs moult yearly. It is calculated that to reach max. sizes 17 and 16 post-larval stages for ♂ and ♀, respectively, would be required. Most crabs mature at 4th and 5th years and an av. ♀ may produce 3 or 4 broods, with a total of 3 to 5 million eggs. Min. legal size is 6½ in., attained by ♂♂ in 7th or 8th year but ♀♀ infrequently. Food consists of shrimp, small crabs, barnacles, amphipods, isopods, molluscs, worms, seaweed (rare). Migration studies suggest an on- and off-shore movement, though no definite tendency was exhibited by tagged crabs.—R. E. Foerster.

17532. MOFFETT, JAMES W. A fishery survey of the Colorado River below Boulder Dam. *California Fish and Game* 28(2): 76-86. 1942.—Construction of Boulder Dam has changed the 30 miles of Colorado R. immediately below the dam into a clear, cold-water stream and made possible the introduction of rainbow trout. Invasion of this river by trout-stream insects was rapid; the dominant form is the mayfly nymph, *Callibaetis*. Algae, chiefly *Cladophora*, blanket the many gravel riffles and are the main source of food for the trout constituting from 70 to 98% of the stomach contents of 43 trout examined. Proposals for the future management of the fishery in this stream are suggested.—J. W. Moffett.

17533. PEARSON, JOHN C. (*Fish and Wildl. Serv.*) The young of some marine fishes taken in lower Chesapeake Bay, Virginia, with special reference to the gray sea trout, *Cynoscion regalis* (Bloch). *U. S. Fish and Wildl. Serv. Fish Bull.* 50(36): 79-102. Map, 24 fig. 1941.—The area of study is located at the mouth of Chesapeake Bay and is bounded roughly by Cape Charles and Cape Henry on the east, Lynnhaven Roads on the south, Old Point Comfort on the west, and Buck River Light on the north. A series of collecting stations was visited, usually weekly in summer and bi-weekly in winter, to determine the seasonal and geographic distribution and variation of the marine plankton. The present paper deals only with the young fishes taken in this plankton. 45 spp. of fishes were recognized in the plankton. 31 spp. were identified and 14 remain unidentified. Larval and postlarval stages of the gray sea trout, or weakfish, *Cynoscion regalis*; the bluefish, *Pomatomus saltatrix*; the harvestfish, *Peprilus aequipinnatus*; the butterfish, *Poronotus triacanthus*; and the stargazer, *Astroscopus guttatus*, are described and figured. Collections of juvenile gray sea trout by seine and trawl indicate that this food fish attains an average total length of 16 to 20 cm. at the end of its first yr. of growth in lower Chesapeake Bay. Brief distributional and descriptive records for the planktonic young of 31 spp. of marine fishes are given.—Auth. summ.

17534. RAJ, B. SUNDER. Dams and fisheries; Mettur and its lessons for India. *Proc. Indian Acad. Sci. Sect. B.* 14(4): 341-358. 2 maps, 2 fig. 1941.—Because most Indian rivers dwindle to trickling streams or cease to flow during the preponderantly dry months, they are not adapted to fish which require long migrations; and the problem of dams does not parallel that of rivers in Europe and America. Moreover, conservation of water by dams is necessary for

irrigation, which is far more important than Indian river fisheries. The only important migratory fish among 24 spp. studied are the mahseer, among carp, the cock-up (*Lates calacarifer*), the goonch (*Bagarius bagarius*), the eel (*An- guilla* sp.), and the Indian shad or hilsa. Dams interfere little with the mahseer, since these ascend streams during monsoon floods which usually submerge the dams; and adult breeders remain in deep rocky pools in the hills, from which they do not migrate far. The elimination of cock-up and of goonch by dams or weirs is desirable, since they are predators. Only very high falls obstruct eel migration. It is concluded that the hilsa is the only consequential fish which needs protection against dams; but it has been found impossible to devise effective fish passes for this sp. However, the hilsa do not return to the parent stream and will seek available ones; they do not migrate to the sources and may therefore breed in short streams and in larger ones whose dams are far from the sea. In such rivers as are dammed near the sea, artificial propagation is recommended. These conclusions were reached by a study of fishery resources above and below the Mettur Dam on the River Cauvery in southern India before and after dam construction, by an analysis of random samples to determine the kinds, sizes, and conditions of fish congregating at the Dam or its sluices, and by the determination of the conditions of mass migration.—L. H. Taylor.

17535. SCHROEDER, WILLIAM C. (*Harvard U., Cambridge.*) Results of haddock tagging in the Gulf of Maine from 1923 to 1932. *Jour. Marine Res.* 5(1): 1-19. 1942.—Nearly 11,000 haddock were tagged in the Gulf of Maine and, of these, 210 were recaptured. In most localities, a substantial part of a haddock population apparently remains localized for periods up to at least 6 to 12 mos. As for the Gulf of Maine migrants, southern haddock tend to move northward and northern haddock tend to move southward. According to length frequency distributions of young fish taken on Georges Bank, haddock in that region are about 6 inches long at 1 yr. of age and about 12 in. at 2 yrs.—W. C. Schroeder.

17536. WENT, ARTHUR E. J. (*Dept. Agric., Fish. Br., Dublin.*) Salmon of the River Erne. Results of the examination of a small collection of scales and data. *Sci. Proc. Roy. Dublin Soc.* 22(49): 471-480. 4 fig. 1942.—The age and growth of salmon of the river Erne in County Longford, Ireland, were studied by examination of 421 sets of scales and data on weight, length, sex and place and date of capture. From these it was determined that 92% of the fish migrated as 2-year smolts and the rest as 1- and 3-yr. smolts in the ratio of 3:2 respectively. Almost 84% were summer fish (58.7% grise and 25.2% small summer fish). The average sizes of the various age groups are given. The mean condition coefficients (relationship between wt. and length) are high and of the same order as for fish of the rivers Shannon and Ballisodare. The lengths at the end of each yr. of life are calculated. The fastest growing fish migrated first. Smolts are divided into 2 groups A and B depending on whether or not the fish had made growth in fresh water in the spring prior to migration as a smolt. Type A smolts have a greater mean length at the end of every year of life than Type B. In the sea the large spring fish have a greater average growth-rate than any other age group.—P. H. Yancey.

17537. ANONYMOUS. Two-way counting weir for salmon. Complete census of salmon migrants taken in Alaska stream. *Progr. Fish Culturist* 56. 23-27. 5 fig. 1941.—A complete census of a spawning run of adult pink salmon (53,594) and of the number of their young (3,402,830) that survived to the sea-migrant stage was taken by biologists of the U. S. Fish and Wildlife Service in 1940 and 1941 in a small stream at Little Port Walter in s.-e. Alaska. A description of the downstream counting weir is given, and it is estimated that 6.44% of the young survived to the migrant stage. This % of survival may be somewhat lower than usual owing to abnormal environmental factors, but even if pink salmon sustain a mortality of 90% while in the ocean, there would still be a large number of adults, (34,000) left to return as spawners in 1942; this would be a much larger run than the average since 1934.—Daniel Merriman.

WILDLIFE MANAGEMENT—TERRESTRIAL

(See also B. A. 16(7): 15958, 16493, 16542, 16784, 16981, 17186; and in this issue 17476, 18325, 18438, 18580, 19050, 19331, 19339)

17538. ALLAN, PHILIP F. (Soil Conserv. Serv., Amarillo, Texas.) Defensive control of rodents and rabbits. *Jour. Wildlife Management* 6(2): 122-132. 1942.—The methods of defensive control are classified as: (1) Physical, including destruction of habitat and creation of non-living barriers; (2) biological, including natural enemies and diseases, changing flora and fauna, creation of living barriers, diversion to other habitats, control in the creation of new environments; and (3) chemical, as chemical barriers and repellents. Defensive methods for the control of rodents are those designed to bring about a change of natural conditions of a permanent or semi-permanent kind unfavorable to the species. Such changes may be physical, biological, or chemical. Some defensive measures are of proved value—namely, tillage practices; grazing of cover crops; destruction of cover by fire; flooding; fencing; encouragement of natural enemies; changing flora by use of fire; changing flora by use of grazing; diversion to habitats immune from injury; and use of chemical repellents. Most of the defensive measures discussed are of suggestive value only; more research and trials are needed. A list of 42 references on the subject is given.—P. F. Allan.

17539. BEULE, JOHN D., and ALLAN T. STUDHOLME. (Penna. Game Commiss., Harrisburg.) Cottontail rabbit nests and nestlings. *Jour. Wildlife Management* 6(2): 133-140. 1 pl. 1942.—Data concerning the breeding and nesting activities of the cottontail in Pennsylvania during the spring and summer of 1939 and 1940 were gathered and compared. The nesting period extended from the middle of March through Sept. May appeared to be the most important nesting month. The av. number of young in 26 litters examined in 1939 was 5.42; in 1940 the av. for 44 litters was 4.95. Each yr. the litters were generally larger during the first half of the nesting season and became smaller as the season progressed. Tarsal measurements proved to be a satisfactory index of age and the basis for a working scale to determine the ages of nestlings. More nests were found in fallow fields than in any other cover type, but these fields did not have the greatest density of nests. The success ratio of nests under observation in 1940 was 68.5% (64% in 1939). The pellets of nestlings were used as an index to the success of old nests.—L. J. Bennett.

17540. BUSS, IRVEN O. (Wisconsin Conserv. Dept., Madison.) Sex ratios and weights of muskrats (*Ondatra zibethica zibethica*) from Wisconsin. *Jour. Mammal.* 22 (3): 220-223. 1 fig. 1941.—Of 2,287 muskrats trapped from Pepin, La Crosse, and Dunn Counties, Wisc., during the fall and early winter of 1939 and 1940, 69% were ♂♂. By Nov. ♀ muskrats that have given birth to young may have their vaginal openings sealed making them appear to be young muskrats or causing them to be mistaken for ♂♂. 237 ♀ muskrats averaged 42 g. heavier than 352 ♂♂ trapped during Nov., 1940, from Dunn Co. No significant difference was found in the wts. of muskrats trapped from creeks and lakes in Nov., 1940.—I. O. Buss.

17541. DAVISON, VERNE E. (Soil Conserv. Serv., Spartanburg, S. C.) Bobwhite foods and conservation farming. *Jour. Wildlife Management* 6(2): 97-109. 1 fig. 1942.—The Soil Conservation Service recognizes wildlife improvement programs as inseparable from agricultural objectives in soil conservation. Conservation of bobwhites (*Colinus virginianus*) is only a small part of the farm problem, but to many southeastern laymen these birds symbolize wildlife. As many management recommendations are too complicated for farmers to adopt, the author studied dry contents of 5,889 bobwhite crops taken by hunters during 3 hunting seasons from a wide section of the Southeast with a view to formulating simple suggestions. Non-food items were discarded and food quantities < 1% by volume were ignored. Comparing local summaries, it became clear that there was no indispensable food item. Farm game management must be based on staples which insure life and health, and changing agriculture necessitates the replacement of food formerly produced on idle lands. Crops (5,189) collected

above the lower coastal plain, separated from those (700) from that region, are the basis of the discussion. Foods (130 kinds) were listed under 5 groups according to importance. Suggestions as to how staple foods may be produced incidentally are made for 5 land-use classes. Simple management practices are recommended as follows: (1) Grow annual lespedezas and small grains in crop rotations as a source of waste foods; cowpeas and soybeans are valuable with corn; bullgrass and crabgrass may be left at final cultivations; (2) provide mast of oaks, gums, pines, hickories, and ashes in woodlands; (3) establish wildlife borders of shrubs and *Lespedeza sericea* for summer fruits and winter emergencies; protect shrubs in marshy areas, on stream banks, in fencerows, on rocky outcrops; and (4) plant kudzu or *L. sericea* for hay so that annual legumes can be returned to the soil and at the same time a supply of their seeds be assured for wildlife.—J. A. Johnson.

17542. FUNK, E. M., J. C. HAMILTON, and H. L. KEMPSTER. Game bird investigations: Quail and chukar partridges. *Missouri Agric. Exp. Sta. Bull.* 435. 1-16. 7 fig. 1941.—In expts. conducted in 1938 and 1939 on the effect of all-night light on quail and chukar partridges the total egg production of these fowl was increased. The larger egg production for the lighted birds was attributed to a longer laying period due to early egg production and also to a higher rate of production. The results obtained on variation between individual quail suggest the possibility of breeding for increased fertility and hatchability. Based on a single trial, flock matings of chukar partridges produced more satisfactory results than did mating in pairs. Best results were obtained when 1 ♂ was mated to 4 ♀♀. In captivity a ♂ quail will mate with > 1 ♀. Eggs from flocks where 1 ♂ was mated with 2 ♀♀ showed a fertility of 97.97%. Maintaining breeding chukar partridges on earth floors resulted in a higher % of fertility and hatchability than was experienced when birds were maintained on wire floors. Chukar partridges produced eggs of av. size after the 1st week of laying. Quail laid eggs of av. size in their 5th week of laying. Hot weather apparently does not have the depressing effect on egg weight in quail and chukar partridges which is experienced in chickens. Quail and chukar partridge eggs increased in size each succeeding month; the wt. of hens' eggs declined to a low point in July. The wt. of chukar partridge and quail eggs was influenced by the position of the egg in the clutch; the largest egg was usually the 1st egg in the clutch. An increase of egg-production in quail and chukar partridges was accompanied by an increase in the size of clutch. The av. chukar partridge egg was 22.37 g. in weight, 4.207 cm. in length, and 3.154 cm. in width; the av. quail egg was 9.13 gm. in weight, 3.095 cm. in length, and 2.401 cm. in width. Chukar partridges under all-night lights consumed an av. of 5 lbs. of feed per pair for each month of the breeding season. The unlighted birds ate an average of approx. 4 lb. of feed per pair for each month. Each pair of all-night lighted quail ate 2.15 lb. of feed, whereas each pair of unlighted quail ate 2.05 lb. per month.—Courtesy *Exp. Sta. Rec.*

17543. HICKEY, JOSEPH J. (424 Univ. Farm Pl., Madison, Wisc.) Eastern population of the Duck Hawk. *Auk* 59(2): 176-204. 1942.—A cooperative survey disclosed about 400 known nesting sites east of the Rocky Mts. Birds have declined in numbers by at least 10% in the more settled regions. Available data indicate a flat type population curve, less eggs in clutches as one goes north, and a hatching ratio of about 75%. Factors affecting distribution are discussed. There is some evidence that ♀♀ vary in sterility according to age. Nesting sites attract the birds like ecological magnets, and to some of these the birds return in spite of repeated persecution. Recommendations for conservation, management and future study are added.—J. J. Hickey.

17544. LEOPOLD, ALDO. (U. Wisconsin.) Spread of the Hungarian partridge in Wisconsin. *Trans. Wisconsin Acad. Sci., Arts and Lett.* 32: 5-28. 1940.—The European gray (Hungarian) partridge (*Perdix perdix*) now inhabits about 7,000 sq. mi. which was populated by spread from a single point in Waukesha County. The longest radius from the point of origin is 102 mi. in 27 yrs. Population pressure was doubtless the propulsive force behind the spread and the

direction of the large outthrusts was northward. The usual mode of spread has been by slow overflow into vacant territory, but sometimes isolated outposts were established at distances of 50 mi. in a single year. The outthrusts are non-selective, but survivals are confined to the richest agricultural soils.—Chancey Juday.

17545. LEOPOLD, ALDO. (U. Wisconsin.) Wisconsin wildlife chronology. *Wisconsin Conserv. Bull.* 5(11): 8-20. 1940.—A history of wildlife shows 2 great movements among the wildlife over a long period of time: retreat, by which there either left the area or were exterminated such forms as buffalo and other large mammals, various birds such as passenger pigeon, wild turkey and grouse, and fur-bearing animals; and invasion, by which such forms as prairie birds, jack rabbits, and other mammals entered the area to establish themselves. The net effect has been fewer total spp., more foreign forms, a decrease in the number of game and fur-bearers, an increase in small birds and rodents, and a replacement of forest and marsh spp. by open upland forms. Human attitudes are also evident and the present day conservation program has developed through prohibitions, substitutions, public works and lands devoted to wildlife, cropping and management of wildlife, and education.—Herbert McCullough.

17546. LOW, JESSOP B. (Iowa Cooperative Wildlife Res. Unit.) Nesting of the Ruddy Duck in Iowa. *Auk* 58 (4): 506-517. 1 pl. 1941.—An investigation of the Ruddy Duck in northwestern Iowa during 3 years (1938, 1939, and 1940) revealed that the most important nesting habitat held stands of hard-stem bulrush and lake sedge occurring either alone or intermixed. Choice of nesting cover was detd. not so much by a preference for certain plant spp. as for a cover type having a desirable water depth. The favored location for nest construction was in vegetation growing in 10 to 12 inches of water. A 71% successful egg hatching was recorded for the Ruddy Duck during the study. Predation was negligible because of the selection of nest sites above water. The most destructive factor to Ruddy Duck nesting was fluctuations in the water level; rapid rises in the water level flooded nests, while the recession of the water level caused nest desertion. Acquisition and stabilization of the water within the nesting habitat appear to determine efficient production of the Ruddy Duck in Iowa marshes.—T. G. Scott.

17547. MITCHELL, WESLEY C., et al. The foundations of conservation education. *National Wildl. Fed. Pamphlet* 3. vi + 242p. Frontispiece, 11 pl. 1941.—The book is by different authors and deals with fundamental aspects of conservation; treatment is popular, with emphasis upon soil and water conservation and biological (including human) interrelationships. Delineation of conservation trends and the lessons apparent from historical experience are given considerable space, as is the need for better integration and more effective application of conservation measures. Chapters and authors are: Conservation, liberty, and economics, by WESLEY C. MITCHELL; Conservation of soil as a natural resource, by W. C. LOWDERMILK; The ABC of conservation, by PAUL B. SEARS; The pitfalls of conservation, by ARTHUR N. PACK; The rôle of applied science in conservation and its relation to wildlife, by W. W. HORNER and RICHARD W. HORNER; and Biology as the foundation of conservation education, by HENRY B. WARD.—P. L. Errington.

17548. MOSS, A. E. (U. Connecticut.) Income possibilities from a small artificial pond in eastern Connecticut. *Jour. Wildlife Management* 6(2): 141-146. 1942.—Many small ponds or old pond sites are to be found in Connecticut. These are on both active farms and areas purchased for residential use. They involve annual expense if kept dry due to non-useable herbaceous growth. This study was for the purpose of learning the possibilities of obtaining an annual income from such pond areas. The assets considered were muskrats, mallards, fishes, frogs, and water lilies. The results of 8 years' trapping and observations show the possibility of a net income of not less than \$10 per acre per yr. where the pond has a depth of <3 feet over most of its area.—A. E. Moss.

17549. PARK, BARRY C. (U. S. Forest Serv., Denver, Colo.) The yield and persistence of wildlife food plants.

Jour. Wildlife Management 6(2): 118-121. 1942.—In connection with the planting of wildlife-food-bearing shrubs and trees on the Monongahela National Forest in West Virginia, observations were carried on to learn the yield and persistence of the fruits of native plants, the objective being to determine which of the species were most desirable for wildlife food planting. 27 spp. were under observation for 4 yrs. The most consistent bearers, with fruit persisting until late winter or spring were: *Ilex decidua*, *Rhus typhina*, *Malus angustifolia*, *Smilax cordifolia*, *Viburnum acerifolium*. The most prolific producers were: *Amelanchier canadensis*, *Crataegus*, *Fagus grandifolia*, *Malus*, *Prunus americana*, and *Prunus serotina*. White and chestnut oaks were very good producers but only about $\frac{1}{3}$ of the trees yielded acorns. The variation in persistence of fruit for most species was only a few days. Seedling apple trees varied considerably in their ability to hold fruit; variation was greater for this than for any other species, 59 days. The most consistent bearers, with fruit persisting until late winter or spring, generally had a good % of plants that bear fruit. From a practicable management standpoint, the variety of spp. of wildlife food plants rather than the number of specimens of one or several individual species is the factor that makes a good environment for wildlife insofar as the yearlong food, and especially the winter food supply, is concerned. With a variety of food plants, the possibilities for wide fluctuations from year to year in the winter carrying-capacity of a good environment are not so great.—B. C. Park.

17550. POLDERBOER, EMMETT B. (Iowa Agric. Exp. Sta.) Seasonal food preference trends of eastern ruffed grouse in Iowa as shown by dropping analysis. *Iowa State Coll. Jour. Sci.* 16(3): 331-335. 1942.—The seasonal trend of food habits of Eastern ruffed grouse (*Bonasa u. umbellus*) was studied by analysis of 176 fecal samples collected throughout the yr. in n.e. Iowa. Acorns, smooth sumac fruit, and other seeds and fruits were especially prominent in the grouse diet in fall and winter. Leaves (predominantly hog peanut, bluegrass, dandelion, and wild strawberry) were taken in greatest abundance in spring and summer. The highest frequency of buds was found in spring months, with 36% of the seasonal total of 43% taken in Apr. when buds were swollen and opening.—G. O. Hendrickson.

17551. RENNER, GEORGE T., and WILLIAM H. HARTLEY. Conservation and citizenship. x + 367p. 118 fig. D. C. Heath and Co.: Boston, 1940. Pr. \$1.25.—Section headings indicating the nature of the treatment are: Disappearing wildlife, wildlife in early America, the American bison, the American parakeet, market hunting, fur trapping, industrial development and wildlife, economic value of wildlife, conservation and restoration. Practical exercises and activities are suggested in connection with each chapter and there is a sectionalized bibliography. The part on wildlife includes 16 titles. Another appendix lists sources of motion pictures pertaining to all departments of the book.

17552. SCHWARTZ, CHARLES W. (Missouri Conserv. Commiss., Jefferson City.) Home range of the cottontail in central Missouri. *Jour. Mammal.* 22(4): 387-394. 1 fig. 1941.—From Dec. 1938 through Mar. 1940, trapping operations were conducted on the Univ. of Missouri Arboretum and Wildlife Exptl. Area, near Ashland, Mo. in an attempt to determine the home range of the cottontail rabbit. The cottontail in this region appears to be an intergrade between 2 subspecies, *Sylvilagus floridanus mearnsi* (Allen) and *S. f. alacer* (Bangs). The 100 acres of trapping-area consisted of a ridge of relatively uniform upland herbaceous cover, surrounded by an oak-hickory woods. Box traps were employed. Trapped rabbits were marked either by tattooing the ears or inserting small metal ear-tags. There were a total of 8,819 trap-days. 254 cottontails were marked. Of these, 127 were retrapped more than once. The sex ratio of the total number of different rabbits was 47% ♂♂ to 53% ♀♀. The av. recorded home range of adult ♂ cottontails trapped was 1.4 acres, with a min. of 0.17 acres and a max. of 4 acres. Comparable figures for ♀♀ are: av., 1.2 acres, min., 0.15, max., 4.9. No significant relationship was found between the number of times an animal was trapped and the

size of its recorded home range. No extensive shifts of population occurred during the 16 months' trapping period although a few adult and young rabbits moved to new locations. During the severe cold and snowy weather of Jan. and Feb. 1940, cottontails left the open area and entered the adjacent woodland, the distances in all cases were not greater than those travelled at other times.—C. W. Schwartz.

17553. STUDHOLME, ALLAN T., and RUSSELL T. NORRIS. (*Pennsylvania Coop. Wildlife Res. Unit, State Coll.*) Breeding woodcock populations. *Auk* 59(2): 229-233. 1942.—During the spring of 1939 a fairly heavy conc. of breeding woodcocks (*Philohela minor*) was observed in the scrub oak-pitch pine forest type of central Pennsylvania. In 1939 woodcocks were heard on Mar. 26, but undoubtedly they had arrived early in Mar. In 1940 the first birds were heard in the bottomland hardwoods on Mar. 29. In the scrub oak-pitch pine area 2 woodcocks were heard on Mar. 30, but territories were not definitely established until the 2d week in April. During 1939, 45 singing ♂♂ occupied the 950-acre scrub oak-pitch pine area; in 1940, 27 ♂♂ were counted. 16 of these birds were utilizing almost exactly the same singing grounds used in 1939, 7 were singing within 50 yards of openings used in 1939, and 4 occupied new territories. 10 ♂ woodcocks were trapped in 1940, 8 being caught on the 1939 study area. 3 were taken on the same singing grounds where birds were banded in 1939, and another was trapped 70 yards from an opening where a bird had been caught in 1939. None of the birds trapped had previously been banded. In addition, 2 woodcocks without bands were seen on singing grounds where birds were banded in 1939.—L. J. Bennett.

17554. SWANSON, EVA DENE BURRIS. (*U. Minnesota.*) The use and conservation of Minnesota game, 1850-1900. *Univ. Microfilm Publ.* 328. 1-321. 1941. Pr. of film copy, \$4.01.—Wild animals, once considered a valuable resource only in the wilderness or on the fringe of settlement, in fact contributed to man's welfare long after frontier days were over. Eventual recognition of their economic and esthetic value and of the possibility of their survival led to the development of a conservation program supported by federal, state, and private organizations. Indians and white traders had sought Minnesota furbearers since the 17th century, and explorers, missionaries, and travelers alike depended on game for food and sport. After the Indian treaties of 1851 opened large areas of Minnesota for farming, towns and villages multiplied, and the wilderness aspects of southern, central, and western regions were obliterated, though much of the northern border area retained its primitive character, suffering somewhat from the inroads of logging companies. In the yrs. after 1850 Minnesota wildlife was becoming adapted to settlement. The extent of the fur harvest in this period can only be estimated by reports in local newspapers and by the records of raw fur companies flourishing in Minneapolis and St. Paul. Legislative action to protect wildlife began even in territorial days. Restrictions on methods of hunting and trapping were formed and market hunting was condemned even in 1871, but official provision for law enforcement was not made until 1890. In the last decade of the century a vigorous effort to stamp out market hunting was made. Sportsmen's clubs of early days often sponsored competitive hunts and contests in shooting. Some clubs adopted law enforcement as one purpose also, and became part of a powerful group pressing for the abolition of market hunting.

17555. WALLACE, GEORGE J. A three-year trial with a feed patch for songbirds. *Jour. Wildlife Management* 6(2): 110-117. 1942.—A 1½-acre plot tilled and sowed with millets, sunflower, and buckwheat over a 3-yr. period at-

tracted large numbers of seed-eating fringillids in the fall, but failed to lure previously unrecorded species. Though migrating birds made intensive use of the patch, the abundance of readily available feed did not perceptibly alter their schedule of migration, except that a few summer resident birds that formerly left in August lingered into October. A serious but unavoidable short-coming of feed patches for songbirds in the northern states is the short period of availability of the food. An annotated list of 17 species of birds making more than incidental use of the plot is given.—G. J. Wallace.

17556. WRIGHT, EDWARD, and LLOYD W. SWIFT. (*U. S. Forest Serv., Denver, Colo.*) Migration census of mule deer in the White River region of northwestern Colorado. *Jour. Wildlife Management* 6(2): 162-164. 1 fig. 1942.—A method of checking a deer population by counting tracks on the shoulders of a road that traverses a migration route. The road was divided into 2-mile, numbered sectors and 2 track counters were assigned to each. Counts were taken each morning after tracks made the previous day were obliterated by dragging the road with a brush drag pulled by a truck. Tracks in the opposite direction to the general migration trend were subtracted from the sector totals. Recording the track counts by days and sectors provided a means of determining the reasons for variations in the migration trend in response to weather, open areas, and areas with brush or other shelter. This method was used to estimate the number of deer that migrate to the summer range on the White River Natl. Forest and was much more accurate than any other previously tried.—Edward Wright.

17557. YEAGER, LEE E. Trappers and fur animals of the original delta region of Mississippi. *Jour. Mammal.* 22(4): 364-378. 2 fig. 1941.—In the flood plain or Delta region of n.-w. Mississippi the preferred habitats of fur animals under essentially original conditions appeared to have been deep cypress-tupelo gum swamps for otters, the hardwood flats bordering water for raccoons, and creeks and smaller runs for minks. Opossums and wildcats (*Lynx rufus*) showed no preference that could be detected by trappers. For all spp. ground dens were infrequent due to the flat terrain and high water table. Until about 1910 hunters took otters mainly by shooting them, after chopping into their hollow tree or log dens. Average annual catches by experienced trappers during the period of about 1907-1915 are estimated at 150 raccoons, 60 minks, 200 opossums, 2 otters, and 5 wildcats. Catches previous to the rise in value of common fur prices, about 1910, were higher, particularly for raccoons and minks. Trappers of the 1910 era lived as nearly on their grounds as possible, and often changed territory several times each season. Following extensive clearing, 1915 and later, trappers increased greatly in number and competition for territory became progressively keen. As a result fur animal populations after about 1920 dropped precipitously over much of the Delta region.—L. E. Yeager.

17558. ZIMMERMAN, F. R. Propagating aquatic vegetation. *Wisconsin Conserv. Bull.* 5(6): 3-5. 1940.—Numerous factors may affect the propagation and subsequent growth of aquatic vegetation for waterfowl nesting and feeding grounds. Stabilized water levels, soft bottoms, clear water to allow for the penetration of sunlight, optimum temp., and optimum acidity or alkalinity are essential for proper growth. Destruction by ice or wave action, covering of the plants with silt, animal activities, and competition of undesirable plants retard or prevent entirely the growth of many plantings. Surveys of prospective planting areas should be made to determine if the area will permit the growth of the plants.—Herbert McCullough.

BIOLOGICAL ABSTRACTS

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GENERAL BIOLOGY

Editors: A. H. GRAVES, *Plant*; C. A. KOFOID, *Animal*
(See also Entries 19416, 21355)

PHILOSOPHY OF BIOLOGY

19380. CHAUDET-DUSOUL, FERNAND. *La métaphysique de la vie*. Vol. III. "Philosophie et Religion" (essai de synthèse). 221p. Presses universitaires de France: Paris, 1941. Pr. 50 francs.

19381. GERARD, R. W. (U. Chicago.) A biological basis for ethics. *Philosophy of Sci.* 9(1): 92-120. 1942.—An attempt is made to suggest a scientific ethics on the basis of biological analysis, in the style of Herbert Spencer.—L. J. Lafleur.

19382. NOVIKOFF, M. [On general and special homomorphism.] *Acta Biotheoretica* 4(2): 85-96. 5 fig. 1938.—The following categories of parallelisms occur in the organization of different animals: homologies, which allude to a common origin of the organs concerned; analogies, which arise secondarily as a consequence of similar functions (typical analogies) or of external influences (isomorphism); the homomorphisms—agreements in bodily structure which come about on the basis of general laws of morphogenesis. One can also distinguish between general homomorphism, which appears in the animal kingdom generally wherever conditions favorable thereto are present, and a special homomorphism which emerges as one of the possibilities in a limited number of animal forms, e.g., compound eyes.—Author.

19383. PI SUÑER, AUGUSTO. *Principio y termino de la biología*. 359p. Ministerio de Educacion Nacional: Caracas, 1941.—The book consists of a series of discussions revealing in a general way the extent of the present knowledge of certain aspects of biology. The author shows constantly the relationship of chemistry and physics as well as metaphysics to the science of biology. He shows further that frequently modern science yields ultimate explanations only slightly more satisfactory than those derived philosophically and that frequently it is as yet incapable of satisfactory explanations for vital processes. The history of various concepts is given in such manner as to reveal the international development of the science of biology. Among the subjects discussed are protoplasm, energy and assimilation, enzymes, equilibria and regulation, tissues and organs, morphogenesis, reproduction, heredity, evolution (including Neo-Lamarckism), ecology, animal associations, human society, resistance and immunity, instincts, life in relation to space and time, and conscience and will.—D. S. Farner.

19384. SIGERIST, HENRY E. (Johns Hopkins U.)

War and culture. *Bull. History Med.* 11(1): 1-11. 1942.—The preservation of culture and of all cultural activities in time of war is a task the importance of which cannot be too highly estimated. Of all branches of learning, the sciences will probably suffer least. To medicine in particular war is a challenge, providing as it does a rich source of experience for the organization and improvement of services in time of peace. The humanities and arts are apt to suffer most, although nothing could be more erroneous than to look upon these as a luxury in times of emergency. To the 18 workers in the rear who, we are told, are needed to supply one man in the fighting line, should be added the researcher, the scientist and the scholar, the teacher, the poet and the artist, for their labor will determine, to a great extent, whether or not the soldier's victory will be set down as loss or as gain for the world.—Sister M. E. Keenan.

TAXONOMY AND NOMENCLATURE

19385. ALLEN, CHARLES E. (U. Wisconsin, Madison.) Regeneration, development and genotype. *Amer. Nat.* 76(764): 225-238. 1942; also in *Science* 95(2467): 365-369. 1942.—The genotype of a many-celled organism is the genotype of the cell with which it originates. This statement holds only if no chromosomal or other mutation occurs during ontogeny. The genotype of the originating cell possesses a much wider range of developmental possibilities than are expressed in the course of so-called "normal" development.—Every cell of a plant begins life as an element of a meristem, and is at first capable of division. The capacity for division may persist for a long time despite a considerable degree of differentiation. The genotype of a tissue cell, like that of the cell which gave rise to the plant, is shown by the variety of cells,

tissues and organs to which, under the most varied conditions, it may give rise. Examination of available evidence shows that a large proportion of individual plant cells manifest the possession of a genotype equivalent to that of the plant as a whole. But it is not demonstrated that all cells of all plants are in this sense totipotent. The opposite is strongly suggested by the fact that, so far as expt. has shown, the cells of some tissues can give rise only to certain organs. Apparently the only possible explanation of such apparent limitations lies in the occurrence of genetically effective cytoplasmic differences between the cells of different tissues or organs.—C. E. Allen.

19386. FURTADO, C. X. (Botanic Gardens, Singapore.) Reference to the description of a provisional name. Rep.

Spec. Nov. Reg. Veg. [Berlin] 49(5/12): 84-86. 1940.—A plea for a clarification of and rewording of the rule dealing with the validation of names published as provisional.—*I. L. Wiggins*.

19387. FURTADO, C. X. (*Botanic Gardens, Singapore*.) The definition of a nomen ambiguum. *Rep. Spec. Nov. Reg. Veg. [Berlin]* 49(5/12): 87-90. 1940.—An objection to the practice of declaring a name ambiguous just because the name has been erroneously applied, even though an identifiable type is extant, is made and a plea for clarification of the rule on this point vigorously put forward.—*I. L. Wiggins*.

19388. MOORE, RAYMOND C., J. MARVIN WELLER, and J. BROOKES KNIGHT. (*U. Kansas*.) Erroneous emendation of generic names. *Jour. Paleontol.* 16(2): 250-260. 1942.—The commonly accepted orthography for many generic names of fossils differs from that which was published originally. Also, some generic names have 2 or more variant spellings that are currently employed by paleontologists. This paper undertakes to analyze and interpret portions of the Internat. Rules of Zool. Nomenclature and published Opinions of the Internat. Commission that bear on the emendation of generic names. Several examples of changes in the spelling of names of genera are considered and the conclusion is reached that only in very clear cut and exceptional cases, as provided in the Rules, is any modification of the original published form of a generic name justified. Stability and uniformity in nomenclature are primary objectives of the Rules, and this calls for strict adherence to rather narrowly interpreted injunctions of the Rules pertaining to emendation of names.—*R. C. Moore*.

19389. SABROSKY, CURTIS W. Types vs. types. *Ent. News* 53(1): 7-9. 1942.—A critique of compendia by Frizzell (1933) and Fernold (1939) on the terminology of types, with a list of 7 terms not found in either.—*C. W. Sabrosky*.

EXPLORATIONS, EXPEDITIONS, ETC.

19390. ARCHBOLD, RICHARD, A. L. RAND, and L. J. BRASS. Summary of the 1938-1939 New Guinea Expedition. Results of the Archbold Expeditions. No. 41. *Bull. Amer. Mus. Nat. Hist.* 79(3): 197-288. 3 maps, 35 pl. 1942.—The authors give an account of the 3d Archbold expedition to New Guinea showing that this expedition worked an unknown area on the slopes of the Snow Mountains between Wilhelmina and the Idenburg R.; of the personnel, equipment, and organization of the expedition, the area, and the itinerary; and descriptions of the collecting stations, the plant formations found, the habitats, and notes on the distribution of birds. The expedition resulted in

the collection of 3,486 specimens of mammals, 4,846 specimens of birds, 549 reptiles and amphibia, about 500 fishes, 100,000 invertebrates, and over 5,000 plants. Many data on the biology and the topography of the area were secured. Data on the natives were also gathered.—*G. R. Lutz, Jr.*

19391. MARTIN, PAUL S. (*Field Mus. Nat. Hist.*) Recent Mogollon discoveries. *Sci. Month.* 54(4): 385-389. 4 fig. 1942.—A discussion of some of the results of an expedition recently returned from New Mexico.—*F. R. Hunter*.

19392. ANONYMOUS. Expediciones científicas en América. *Ciencia [Mexico]* 2(5): 221. 1941.—An account of botanical explorations in Colombia by Hernando García Barriga (Inst. Cien. Nat. Bogota), E. P. Killip (Smithsonian Inst.), and E. K. Balls (Imp. Agric. Bur., London); and of botanical exploration on Putumayo (Colombia) by Prof. J. Cuatrecasas.

MISCELLANEOUS

19393. HENRY, EDWARD A. (edited by.) Doctoral dissertations accepted by American universities, 1940-1941. No. 8. xiii + 142p. H. W. Wilson Co.: New York, 1941. Pr. \$2.50.

19394. JORDAN, P. Die Stellung der Quantenphysik zu den aktuellen Problemen der Biologie. *Arch. ges. Virusforsch.* 1(1): 1-20. 1939.—A review.

19395. RAO, H. SRINIVASA. Zoology. The urgent need for Biological Stations in India. *Sci. and Culture* 7(8): 4. 1942.—Desultory surveys show that there is a wealth of plant and animal material in the waters in and around India, but there is only 1 marine biol. station in India, the Travancore Univ. Station at Trivandrum. The size of India, the variety of its physiographical conditions and the distances which separate the university centers from each other call for at least a dozen more biological stations, freshwater as well as marine.—*M. D. Rogick*.

19396. SCOTT, J. P. (*Wabash Coll.*) Science and social action. *Science* 96(2480): 39-40. 1942.

19397. ANONYMOUS. A list of plant scientists in Central and South America. *Chron. Bot.* 7(3): 97-133. 1942.—A preliminary list of about 2000 workers in pure and applied botanical sciences arranged by countries. Name, address, and field of specialization is given for each.—*L. J. Gier*.

19398. ANONYMOUS. Science and practice in agriculture. *Nature [London]* 149(3791): 722-723. 1942.—The County War Agricultural Committees are expected to influence dissemination of technical information to farmers and to improve production by the weaker ones by getting them to accept the methods practiced on progressive farms for years.—*E. D. Crabb*.

BIOGRAPHY, HISTORY, AND BIBLIOGRAPHY

Editors: CARROLL W. DODGE, EILEEN R. CUNNINGHAM, T. C. RUCH, JUDITH W. HUNT

(See also Entries 19512, 20192, 20570, 20803)

HISTORY

19399. COHN, ALFRED E. (*Rockefeller Inst.*) Changes in public attitudes toward medicine: historical aspect. *Bull. History Med.* 11(1): 12-35. 1942.—In the course of 30 centuries or more lay and temple medicine, or rational and non-rational medicine, have ever existed side by side. The former dominated in those ages characterized by a naturalistic philosophy; the latter in those centuries in which a mystical, transcendental philosophy had the greater appeal. The medical developments of fifth century Greece, of the Middle Ages, and of the modern world illustrate this fact. The hope of rational medicine is that ultimately temple medicine will be rendered all but superfluous.—*Sister M. E. Keenan*.

19400. PAGEL, WALTER. John Baptist van Helmont: De Tempore and the history of the biological concept of time. *Isis* 33(5): 621-623. 1942.—Van Helmont's religious-philosophical and his scientific concepts are interdependent. His aim was the investigation of the specific divine seed present in every entity and individual—neither matter nor soul, but with the potential qualities of both. The seeds might be detected by the "spiritualisation" of matter

achieved by combustion. Thus "gas" is discovered, a specific substance responsible for the characteristic form and function of the individual. Time is the primordial divine principle inherent in the seeds and determining the length and intensity of life of every being. It governs the speed of biological processes and the life-rhythm, which is specifically different in each individual. This applies also to disease.—*R. P. Bigelow*.

19401. RAYCHAUDHURI, S. P. A short account of the agricultural methods practiced in ancient India. *Sci. and Culture* 7(1): 10-17. 1941.—The account of agric. methods employed in prehistoric India is obtained mainly from archeological evidences; the accounts for the times of the early Indo-Aryans and the Buddhist and Hindu kings are obtained from early Vedic and Post-Vedic literatures. Determination of the exact periods of the ancient Indian literatures is difficult. From these evidences it is known that wheat (*Triticum compactum* or *T. sphaerococcum*), barley (*Hordeum vulgare*), cotton, melons and dates were cultivated as early as 3250-2750 B.C. Skeletal remains of bull, buffalo, sheep, elephant, camel, pig and fowl found among the ruins of ancient cities indicate that these animals were

long domesticated. Numerous quotations from ancient literature describe agricultural practices, cultivation of food and other crops, care of domestic animals, fisheries, irrigation and insect pests.—*M. D. Rogick.*

19402. RIVERA M., IRENE. (*Inst. Biol., Mexico.*) *Ensayo de interpretacion botanica del Libro X de la Historia de Sahagun. An. Inst. Biol. Univ. Nacion. [Mexico]* 12(1): 439-488. 1941.—This paper deals with the botanical interpretation of the plants mentioned by Sahagun in his "History of the things of New Spain," chiefly from vol. III, Book X. Systematic identification was aided by comparison with the Florentine Manuscript of Sahagun and with the medicinal properties of the plants mentioned, as compared with modern pharmacological studies.—*Irene Rivera.*

19403. SIGERIST, HENRY. (*Johns Hopkins U.*) Early medieval texts in manuscripts of Montpellier. *Bull. History Med.* 10(1): 27-47. 3 fig. 1941.—This is a list of photostats of the manuscript collection of the Medical School of the Univ. of Montpellier available at the Johns Hopkins Inst. of the History of Medicine.—*Sister M. E. Keenan.*

19404. WALKER, LOUISE. (*Northwestern U. Med. Sch.*) Medical history collections in the United States and Canada. VI. Special collections in the Archibald Church Library, Northwestern University Medical School. *Bull. History Med.* 11(1): 87-89. 1942.—The special collection in the Archibald Church Library includes bookplates, stereopticon slides, portraits, manuscripts, autograph letters, surgical instruments, medical memorabilia, medallions and early works.—*Sister M. E. Keenan.*

19405. WOODRUFF, LORANDE LOSS. (*Yale U.*) Some pioneers in microscopy, with special reference to protozoology. *Trans. New York Acad. Sci.* 1(5): 74-77. 1939.—An historical survey up to the time of Siebold and his establishment of the phylum Protozoa.—*H. H. LaFuze.*

BIBLIOGRAPHY

19406. CLINICS. Volume 1, Number 1, June 1942. Editorial Committee: GEORGE MORRIS PIERSOL, FRANCIS GILMAN BLAKE, RUSSELL L. CECIL, VERNON C. DAVID, NICHOLSON JOSEPH EASTMAN, KARL MUSSER Houser, WILLIAM JOHN KERR, JOHN W. McNEE, JONATHAN C. MEAKINS, GEORGE RICHARDS MINOT, JOHN WALKER MOORE, JOHN HERR MUSSER, LEWIS J. POLLOCK, ISIDOR S. RAVDIN, BORDEN SMITH VEEDER, GEORGE BARCLAY WALLACE, and ALAN C. WOOD. Bi-monthly. v+264p. 17 articles. Published by the J. B. Lippincott Company, 227 S. 6th St., Philadelphia, Pennsylvania. Subscription price \$12.—*Clinics* is a bi-monthly journal replacing New International Clinics. Its editor and publisher plan a definite symposium for each number which will cover such important subjects as nutrition, endocrinology, pediatrics, etc. Much of each issue is to be reserved for original contributions, many concerning military medicine, which will be of interest to every general practitioner. The following papers comprise this first issue:—General considerations of the burn problem by I. S. RAVDIN; The local treatment of burns by HENRY N. HARKINS; Plastic repair of burns with free-skin grafts by JAMES BARRETT BROWN and FRANK McDOWELL; The use of plasma in the treatment of shock due to burns by J. E. RHOADS, WILLIAM A.

WOLFF, W. E. LEE and H. SALTONSTALL; Physiological and clinical basis for treatment of shock by C. WESLER SCULL and JOHN EIMAN; Shock and its treatment by PAUL G. WEIL and JONATHAN C. MEAKINS; Epidemic influenza in North Carolina (1941) by DAVID T. SMITH and E. E. MENESEE, Jr.; Headache of otorhinologic origin by ABRAM H. PERSKY; The evaluation of cardiac efficiency by DAVID J. GILMORE; Generalized adenopathy: The diagnosis of hematuria by J. H. MUSSER; Prepubertal vulvovaginitis by J. D. RUSS, CONRAD G. COLLINS and SAM POWELL; The management of rupture of the uterus near, at, or past term by WOODARD DAVIS BEACHAM and GEORGE A. VARINO; The treatment of auricular flutter by W. A. SODEMAN and H. T. ENGELHARDT; Deficiency of the B vitamins as a complication of disease states by GRACE A. GOLDSMITH; Tuberculous pericarditis with effusion by GEORGE E. BURCH and TRAVIS WINSOR; The necessity of a complete diagnostic study in certain types of pulmonary disease by WILLIAM H. GILLENTINE; and Responses of peripheral blood vessels in man to various drugs by DAVID I. ABRAMSON.

19407. COMSTOCK, WILLIAM P. Dating the *Systema Entomologiae*, by Fabricius and *Papillons Exotiques* Volume I, by Cramer. *Jour. New York Ent. Soc.* 50(2): 189-190. 1942.—An argument to establish the priority of publication of the *Systema Entomologiae* over *Papillons Exotiques* Volume I for the purpose of fixing the priority of the names proposed by Fabricius.—*W. P. Comstock.*

19408. GARSIDE, S. Sir John Barrow's copy of Aiton's "Hortus Kewensis." *Jour. S. African Bot.* 6(2): 71-72. 1940.

19409. MILLER, GENEVIEVE. (*Johns Hopkins Inst.*) Bibliography of the history of medicine in the United States and Canada—1941. *Bull. History Med.* 11(4): 437-473. 1942.—The items which comprise this bibliography are listed under the following headings: biography, dentistry, diseases, general, hospitals, journals, libraries, museums, local history and societies, medical education, medical science and specialties, military medicine, nursing, pharmacy, professional history, public health and preventive medicine, and surgery.—*Sister M. E. Keenan.*

19410. NAKAI, T. The exact date of publication of Botanist's repository. *Jour. Jap. Bot.* 17(7): 422-424. 1941.

19411. PROGRESS-BULLETIN. Volume 1, Number 1, April 1942. Editor: DONALD H. ALDEN. Editorial Board: VELMA O. ABNEY, CHARLES W. ANDERSON, EDMUND A. CYKLER, JOSEPH E. JOHNSTON, VERNON R. KING, RICHARD G. LILLARD, ORVIL F. MYERS, DONAL B. PHELEY, JANICE M. PIDDUCK, JOHN F. PUTMAN, LAWRENCE P. PSARKS, and DOROTHY B. STINSON. Adviser ex officio: Director ROSCO C. INGALLS. 44 pages. 4 articles. 1 biological contribution. Published for the Los Angeles City Junior College District by the College Press, Los Angeles City College, Los Angeles, California.—Progress-Bulletin was established as a means of publishing research contributions, in all fields of knowledge, by members of the faculty of Los Angeles City College. The first issue contains one biological contribution: New localities for *Trypanosoma cruzi* Chagas in California by SHERWIN F. WOOD.

EVOLUTION

ALFRED EMERSON, *Editor*

(See also B. A. 16(7): Entries Cytogeography in *Sedum*, 15747; Cytotax. and speciation in *Rumex*, 15751; Cytogeography and speciation in Scandinavian plant spp., 15752; Mammalian body-size as related to litter size and twinning, 15792; Speciation in domestic animals, 15796, 16473, in fungi, 16845, in *Paramecium*, 17200, in copepod, 17256, in *Anopheles*, 17279, centers for birds, Great Basin (U. S.), 17313, in horned owl, 17318, in mouse, 17325; Coat-color dilution in *Cavia*, 15797; Ever-sporting types in bacteria, 16567; Polymorphy of Scandinavian *Poa arctica*, 16853; Beetles, 17272, 17277; Geogr. distr. of sizes in bird, 17319; and in this issue Regeneration, development and genotype, 19385; Speciation in *Drosophila*, 19466, 19467, in beetle (*Epilachna*), 19470, in cormorants, 21367, in kingfishers, 21387; Adaptation to land life in *Ambystoma*, 19519; Species stability in bacteria, 20445, 20446; Mutation in bacteria, 21125; Variability in laboratory-bred fruit-flies, 21188; Air-bladder reduction in fishes of Gangetic Delta, 21353; Adaptations for tree-trunk foraging in birds, 21385; Extinction of bird spp., 21388; Origin of N. Amer. mamm. fauna, 21421)

19412. BABCOCK, E. B., G. L. STEBBINS, Jr., and J. A. JENKINS. (*U. California, Berkeley.*) Genetic evolutionary processes in *Crepis*. *Amer. Nat.* 76(765): 337-363.

2 fig. 1942.—(I.) Theoretically the basic processes of genetic change are gene mutations and gross structural changes in the chromosomes. (II.) Evidence:—(1) Geographically

and morphologically *Crepis* is a natural group with 1 center of origin, a wide distribution and great variation—from primitive to advanced spp. (2) Genetic evidence shows that closely related spp. differ in numerous genes. (3) Cytological evidence reveals progressive reduction in number, total length and symmetry of the chromosomes. Parallel trends exist between (a) morphological similarity and chromosome similarity; (b) reduction in chromosome number and reduction in size and life cycle of the plant; (c) increase in asymmetry of the chromosomes and progressive speciation. (4) Cytogenetic evidence:—(a) Meiotic behavior in hybrids indicates more or less genic homology in the chromosomes of numerous species investigated. (b) Structural hybridity in certain spp. throws light on phyletic relations. Thus *C. kotschyana*, a 4-paired sp., must have originated from a 5-paired ancestor, and 3-paired *C. fuliginosa*, from a 4-paired ancestor, the latter certainly by means of reciprocal translocations between non-homologous chromosomes. (c) The majority of chromosome aberrations caused by x-rays and the aging of seeds are just such translocations. (d) Intraspecific sterility originates through such translocations as well as through gene mutations. (III.) The primary genetic processes causing evolution in *Crepis*:—(1) Gene mutations lead to (a) morphological and physiological differentiation; (b) accumulation of intra- and inter-specific sterility; (c) probably progressive reduction in chromosome size. (2) Changes in chromosome structure induce (a) inter-sterility which may lead to speciation when accompanied or followed by gene mutations; (b) karyotype evolution. Gene mutations and gross structural changes in the chromosomes proceed independently but apparently fortuitously in *Crepis*. The secondary genetic processes causing evolution in *Crepis* are interspecific hybridization, polyploidy and apomixis.—E. B. Babcock.

1943. ELIAS, HANS. (Middlesex U., Waltham, Mass.) Chromatophores as evidence of phylogenetic evolution. *Amer. Nat.* 76(765): 405-414. 6 fig. 1942.—The adepidermal melanophores which are situated immediately under the epidermis undergo, in the series of Amphibia, the following evolutionary change: In embryos and young larvae they are generally thread-shaped. In Urodela they become flat and movable. In tadpoles of *Discoglossus* they remain thread-shaped forming, by mutual adhesion, a polygonal network; lose their movability; and assume a supporting function. In *Bombina*, *Alytes*, and *Pelodytes*-tadpoles they remain thread-shaped and immovable, form a rectangular network, but do not adhere to one another. In some generations of the Zürich population of *Bombina* they are pigmentless. In young *Alytes*-tadpoles they are pigmented, but regularly lose their pigment while growing older. Adepidermal melanophores are entirely absent in higher Anura. Since the adepidermal melanophores have lost their color-regulating function, from *Discoglossus* on, 2 other kinds of melanophores develop with the physiological properties of the adepidermal melanophores of Urodela, but morphologically different from them: the subcut. melanophores in tadpoles, and the intracut. melanophores in adults.—Hans Elias.

1944. HUXLEY, JULIAN. (Zool. Soc., London.) Degeneration and relict adaptation. *Nature [London]* 149 (3790): 687-688. 1942.—It is held that in outbreeding animals and plants functionless organs tend to disappear by degeneration or/and excessive variation; while in organisms

that reproduce other than by cross-breeding the relict adaptations fail to degenerate.—E. D. Crabb.

1945. MATHER, K. (John Innes Hort. Inst., Merton, London.) The polygene concept. *Nature [London]* 149 (3791): 731-732. 1942.—Correlated response to selection appears to be an inevitable property of polygenic inheritance. It is of great help in understanding evolutionary changes, such as degeneration of unused organs.—E. D. Crabb.

1946. RITCHIE, JAMES. Perspectives in evolution. *Ann. Rept. Smithsonian Inst.* 1940. 249-269. 1 fig. 1941.—Although much of the mystery of life is disappearing before the inquiries of the physicist and chemist, minute analysis still stops short of the secret of life. Evolution of life is an integration and not an increase of randomness. The secret of the living organism is its power to build up high potential energy from materials of lower potential. Existence of life may be taken as axiomatic, not as a vital force which animates something different, but as the activity of an atomic combination, the activity being unanalyzable by standard methods of the physicist and chemist. Life has existed on the earth for perhaps 1,200 millions of yrs. Some spp. extend back 2 million yrs. and some genera to the Ordovician. Millions of yrs. may be required for the divergence of some spp., but Scottish island spp. of mammals have not taken more than 20,000 yrs. to evolve. Civilization reduces numbers and causes extinction of the largest animals, increases numbers of smaller animals dependent on cultivation and human habitations, and creates cosmopolitanism throughout world faunas. In a few thousand yrs. the old order of nature will be superseded in the fauna of the world by a new order of mankind. For human beings this future lies in the development and perfection of social life and in the spreading of the social idea to include peoples and nations as well as individuals. We cannot regard mankind to be more than a stage in life's progress toward a greater future.—A. E. Emerson.

1947. SHULL, A. FRANKLIN. (U. Michigan.) Two decades of evolution theory. *Amer. Nat.* 76(763): 171-178. 1942.—The importance of ordinary genetic processes in evolution has been challenged on the ground that, although they produce diversity, they do not account for origin of species. Goldschmidt holds that to originate a species a "new reaction system" must arise. What is a new reaction system? He suggests that chromosomal reorganization is an important way of producing one, but offers no standard of newness. The only criterion of a new reaction system must be whether it will work along with the old one, that is, whether individuals possessing it are interfertile or intersterile with the old type. Mere accumulation of differences does not entail intersterility. Certain kinds of changes affecting reproduction (which presumably may be mutations as well as chromosomal reorganizations) are responsible for intersterility. These may occur early or late; that is, individuals may become intersterile while still closely resembling, or only after considerable divergence of phenotypes has taken place.—A. F. Shull.

1948. TÉTRY, A. Le Pamir et la naissance d'espèces nouvelles. *Rev. Sci. [Paris]* 79(3): 190. 1941.—A summary on Pervola's researches (C. R. (Doklady) Acad. Sci. URSS. 25, 419, 1939) on a wild, alpine Mexican potato, *Solanum vallis mexici*. This plant being originally triploid ($2n=36$) became hexaploid ($2n=70-75$) when cultivated in the dry climate of the Pamir desert (2,320m alt).—H. Simons.

CYTOLOGY

Editors: R. E. CLELAND, Plant; C. E. McClung, Animal

(See also Entries 19446, 20891, 20893, 21109)

PLANT

1949. BHALLA, V. Sterility in *Euphorbia royleana* Boiss. *Proc. Indian Sci. Congr.* 28: paper no. 27. 1941.—Counts during diakinesis showed the chrom. number to be 30. Lagging chromosomes were frequent. The microspore was binucleate and appeared to be functional. The archesporial cell was buried 2-3 layers deep in the nucellus and degenerated after a time. The ♀ flowers shrivel up

after a time and hence the species resorts to vegetative propagation.—K. T. Jacob.

1940. DANGEARD, PIERRE. L'action des fixateurs sur les noyaux euchromocentriques. *Compt. Rend. Acad. Sci. [Paris]* 212(4): 173-175. 1941.—Researches on the influence of different fixing fluids (Bouin, Bouin-Hollande, Nawaschin, Helly, Champy, Flemming, Regaud) on the structure of euchromocentric nuclei of bean, radish, pump-

kin, white lupine, *Ricinus*, *Brassica campestris*, and *Luffa cylindrica*. With the 1st 3 agents mentioned the nuclei are of reticulated or reticulo-granulated structure while Os containing fluids (the 3 last ones) often leave the nucleus in a practically homogeneous condition.—H. Simons.

19421. DATTA, N. Note on the chromosome number in double-flowered *Polyanthus tuberosa* Linn. *Proc. Indian Sci. Congr.* 28: paper no. 28. 1941.—The haploid number is 30 and the complement consists of 5 large and 25 small chromosomes. The 1st and 2d divisions are normal.—K. T. Jacob.

19422. DUSSEAU, ALINE, et CLOTILDE MAGNANT. Etude caryologique et dénombrement chromosomique chez une Phaséolée, *Voandzeia subterranea* Thours. *Compt. Rend. Acad. Sci. [Paris]* 212(11): 455-456. 1941.—The nucleoplasm of the euchromocentric nucleus is grayish after hematoxylin and pink after Feulgen's stain. There are 18-22 small, oval, rounded chromocentric granulations attached to the nuclear membrane. The nucleus is generally single and vacuolized. In metaphase 22 chroms. are present; after colchicine, plates with 88 chromosomes were obtained.—H. Simons.

19423. LÖVE, DORIS. Some contributions to the cytology of Silienoideae. *Svensk Bot. Tidskr.* 36: 262-270. 1942.—In *Silene* the chromosome number is almost always $2n=24$, i.e., the diploid one. Only 3 polyploids occur, *S. vallesi* ($2n=48$), *S. ciliata* ($2n=24$, 48, 192) (Blackburn) and *S. pontica* ($2n=48$) (Vladesco). The chromosome numbers are here given for the species *S. maritima*, *bastardii*, *sartori*, *acaulis*, *juncea*, *otites*, *mellifera*, *catholica*, *livida*, *italica*, *aegyptiaca* and *japonica*, all having $2n=24$ chromosomes, *Agrostemma githago* $2n=48$, *Viscaria vulgaris* $2n=24$, *Cucubalus baccifer* $2n=24$, *Vaccaria pyramidata* $2n=30$ and *Dianthus deltoides* $2n=30$. Polysomy was observed in 2 *Silene* spp., and strikingly different degrees of spiraling were observed in the mitotic metaphase in *S. livida*. A discussion on the differences encountered in some of the species is given.—Åskell Löve.

19424. MULAY, B. N. (Karachi, India.) Chromosome number in *Ephedra foliata* found in Sind. *Proc. Indian Sci. Congr.* 28: paper no. 19. 1941.—The chromosome number of *Ephedra foliata* has been reported to be 7 and other spp. are reported to have multiples of that number. Material collected from Sind gave a higher chromosome count.—K. T. Jacob.

19425. RAGHAVAN, T. S. (Annamalai U.) Contribution to the morphology and cytology of *Alpinia calcarata* Rosc., with special reference to the theory of zingiberous flowering. *Proc. Indian Acad. Sci. Sect. B.* 13(5): 325-344. 59 fig. 1941.—In *A. calcarata*, $2n=48$. The behavior of prochromosomes in mitosis is descr. They are the persistent chromatic portions adjacent to the centromeres. Their mitotic cycle is essentially the same as that of the normal chromosomes. The pollen tetrads are linear, but T-shaped tetrads are also common. The embryo sac develops normally from a hypodermal archesporium from which a primary parietal cell is cut off, usually without further periclinal division. The labellum of the flower is a single structure and forms the anterior member of the outer staminal whorl, the 2 postero-lateral staminodes being absent. The inner staminal whorl is made up of the posterior fertile stamen and the 2 antero-lateral glands. The frequent occurrence of flowers with 2 fertile stamens is interpreted on this basis. The nature of the inflorescence is discussed. It is considered to be a scorpoid cyme. 21 references.—W. C. Tobie.

19426. SMITH, LUTHER. (Missouri Agric. Exp. Sta., Columbia.) Cytogenetics of a factor for multiplid sporocytes in barley. *Amer. Jour. Bot.* 29(6): 451-456. 17 fig. 1942.—A recessive factor in barley ($n=7$) is described which disturbs the process of meiosis, resulting in pollen mother cell masses with <7 to >100 pairs of chromosomes at 1st metaphase. The explanation favored is that the walls of the pollen mother cells are not laid down or are inadequate to prevent the assembling of chromosomes from different cells. The presence of occasional quadrivalents indicates either that cytokinesis did not occur in some premeiotic divisions or that chromosomes from different "cells" were able to synapse. In other instances the chromosomes apparently congress at the time the metaphase plates

are formed. In plates with many bivalents the spindle is much wider but little if any longer than normal. Microspores vary in size but contain little if any starch. Affected plants are only slightly reduced in size, but are highly sterile even when pollinated with pollen from normal plants.—Luther Smith.

19427. SPARROW, A. H. The structure and development of the chromosome spirals in microspores of *Trillium*. *Canadian Jour. Res. Sect. C. Bot. Sci.* 20(4): 257-266. 2 pl. 1942.—The chromonemata in each metaphase chromatid and each anaphase chromosome form a large-gyred, hollow spiral. This spiral develops gradually during prophase by an increase in gyre diam. and a decrease in gyre number and in chromatid length. Its development is associated with the elimination not the production of chromatid relational coiling. At later stages an irregular waviness or "minor" somatic spiral is visible along its "major" gyres, in which reversals of direction can also be discerned. Where the spiral can be seen to be double-stranded it is plectonemic (as early as mid-prophase). The prophase to metaphase chromatid contraction ratio is not less than 6:1. Mean chromonema length increases from 650 ± 172 at metaphase to 977 ± 28.3 at anaphase. This latter length is approximately that estimated for early meiotic prophase. Chromosome volume also increases (about 2-fold) during the interval between metaphase and anaphase. Mean chromonema length and gyre number in microspore anaphase chromosomes are more than twice as great as those of meiotic anaphase chromosomes. Since the chromosomes at these stages are of approx. the same mean length the gyres of the somatic spiral are thus more tightly "packed." In *Trillium*, microspore anaphase chromosomes are considered to be of essentially the same spiral structure as meiotic 2d-division chromosomes, i.e., a single coil (but not single-stranded), rather than 2 or more independently coiled chromatids. The process of reducing this plectonemic spiral into parallel, freely-separable chromatids begins in one prophase as a reduction in gyre number and continues as relational uncoiling in the next. Paradoxically, therefore, a spiraling cycle such as that described above can be interpreted as an uncoiling process in which successive cycles overlap in prophase.—Auth. abst.

19428. THOMPSON, W. P. (U. Saskatchewan), and ISABEL HUTCHESON (McGill U.). Chromosome behaviour and fertility in diploid wheat with translocation complexes of four and six chromosomes. *Canadian Jour. Res. Sect. C. Bot. Sci.* 20(4): 267-281. 1 pl., 17 fig. 1942.—Seven reciprocal chromosome translocations involving 6 of the 7 haploid chromosomes of *Triticum monococcum* were studied in all possible heterozygous combinations. Plants with 1 complex of 4 chromosomes show only 5-10% sterility; those with 2 complexes of four, 10-20%; those with one complex of six, 20-30%. Completely random segregation in such types should cause 66.6, 88.8, and 90% sterility, respectively; segregation directed only by the necessity that homologous centromeres go to opposite poles should cause 50, 75, and 75%, respectively. The low sterility of translocation heterozygotes in wheat, as compared with these expectations, and with results reported in maize and other plants, is due to the fact that segregation is usually alternate (disjunctional) in complexes both of 4 and 6. The forces of repulsion operating at metaphase involve the whole body of the chromosome. In the absence of complicating features this naturally results in alternate segregation in complexes. Semisterility is due, not to basically random segregation, but to special conditions such as interstitial chiasmata, early opening of the complex, and crossing-over between the centromere and the point of interchange. The latter is favored by a non-median position of the centromere, great length of chromosomes, and shortness of at least one interchanged segment. The 50% sterility usually reported for translocations has no special significance; no particular % is characteristic of translocations in general. In complexes of 6, double-cross configurations are more numerous than stars, and present many variations in form depending on the length and position of the segments exchanged. Additional factors producing sterility in large complexes are unwieldiness and crossing over in the segment that joins the 2 crosses.—Auth. abst.

ANIMAL

19429. BEAMS, H. W., and R. L. KING. (State U. Iowa.) The origin of binucleate and large mononucleate cells in the liver of the rat. *Anat. Rec.* 83(2): 281-295. 2 pl. 1942.—Removal of about $\frac{1}{3}$ of the liver of albino rats is followed by rapid mitotic multiplication of cells in that part of the liver remaining. Cytological studies were made on the excised liver and on the restoring liver 3 days after operation. Amitosis was not observed. Binucleated cells originate in the liver as a result of the failure of the 2 presumptive daughter cells to divide during mitosis although the nucleus has divided. Since each of these daughter nuclei is diploid the binucleated cell resulting is tetraploid. The 2 nuclei of binucleated cells prepare for the next division synchronously but usually only one spindle is formed at metaphase so that either 2-tetraploid daughter cells result from a complete mitosis, or cytokinesis may be suppressed again, thus giving rise to a binucleated cell with 2 tetraploid nuclei. Since there is no compensating process whereby the polyploid number of chromosomes is reduced to the normal diploid number, the liver may come to contain a large proportion of polyploid cells, both uninucleate and binucleate. The process in the restoring liver merely represents an acceleration of the condition found in the control liver. The great variability in size of nuclei and cells in the liver of adult rats may be referred to the suppression of cytokinesis in one or more mitotic cycles.—Auth. (courtesy Wistar Bibl. Serv.).

19430. BRAUNGART, D. C., and G. E. OTT. (Catholic Univ. America.) A cytological study of the effect of colchicine on *Drosophila melanogaster*. *Jour. Heredity* 33(5): 163-165. 2 fig. 1942.—Eggs and larvae of the fruit fly were immersed in conc. solns. of colchicine ranging from 0.5% to 1%. In other expts. larvae and eggs were injd. with a colchicine soln., while in other cases larvae were fed colchicine. Best results were obtained with injd. larvae. Absence of a spindle resulting in arrested metaphases was common. A true anaphase was lacking. The most imp. single effect was the production of polyploid areas in the brain. A definite increase in the number of chromosomes was observed though often due to coalescence and clumping the exact number was difficult to count. The larval period was also considerably prolonged.—D. C. Braungart.

19431. CAULLERY, MAURICE. Sur la détermination du sexe chez les isopodes Epicarides. *Compt. Rend. Acad. Sci. [Paris]* 212(3): 108-112. 1941.—Suggestions for expts. on sex determination in Epicaridae, preferably with *Portunion koessmanni*, *Portumnus variegatus* (*Platyonychus latipes*). Relations to be studied to the Calyptaceidae (*Crepidula* spp.), Eunicidae (*Ophyotrocha puerilis*), Cryptoniscidae and *Bonellia* are discussed.—H. Simons.

19432. CHATTON, EDOUARD, et ODETTE TUZET. Sur quelques faits nouveaux de la spermiogenèse du *Lumbricus terrestris*. *Compt. Rend. Acad. Sci. [Paris]* 213(11): 373-376. 12 fig. 1941.—Mitochondrial elimination precedes classic Golgi elimination. The author observed the transient existence of a long flagellum (the acrosomial flagellum) inserting into the head of the spermatozoon at the end of the period where the spermatozoon is still fixed in the cytophore. An enigmatic corpuscle (sporoid corpuscle) is formed by the anterior centrosome preceding a little that of the acrosome; this body emigrates all along the head of the spermatozoon up to the intermediary piece by the contact of which it is resorbed. This sporoid body is formed in only half of the spermatozoa contained in a given cytophore. These corpuscles seem to play a rôle in sex determination by the respective spermatozoa.—H. Simons.

19433. CSIK, L., and P. C. KOLLER. Relational coiling and chiasma frequency. *Zeitschr. Zellforsch. u. Mikrosk. Anat. Abt. B. Chromosoma: Zeitschr. Zellkern- u. Chromosomenforsch.* 1(2): 191-196. 5 fig. 1939.—Using the largest pair of chromosomes, in each of 5 spp. of locust, the authors determined the amount of relational coiling of chromatids, the approx. length of the chromosomes, and the chiasma frequency. Counts on the number of chiasmata in 50 nuclei of primary spermatocytes determined the av. chiasma frequency. Comparison of these measurements shows that there is no direct proportionality between chromosome length and the amount of relational coiling.

A statistical analysis shows that there probably is a positive correlation between relational coiling of sister chromatids and chiasma frequency. The correlation also indicates that the coiling of chromosomes at meiotic prophase may be of the same origin and nature as that of the coiling of chromatids at mitotic prophase.—Jean Lane.

19434. GEITLER, LOTHAR. Das Heterochromatin der Geschlechtschromosomen bei Heteroptera. *Zeitschr. Zellforsch. u. Mikrosk. Anat. Abt. B. Chromosoma: Zeitschr. Zellkern- u. Chromosomenforsch.* 1(2): 197-229. 1939.—A study of 16 spp. from 4 families of the Heteroptera shows that the Y chromosomes are heterochromatic in somatic cells, but not the X chromosomes. Chromocenter formation depends on failure of the daughter chromatids to move apart in the endomitoses by which polyploidy arises. The relatively small unpaired X chromosome of *Syromastes marginatus* is not heterochromatic in somatic cells. The general behavior of the sex chromosomes suggests that the Y chromosomes of Heteroptera have fewer chromomeres than the somatically euchromatic X chromosomes; that chromomeres determine the structural organization of the chromosomes, and that in heterochromatic chromosomes the normal (euchromatic) ratio of chromomere number/chromosome mass is altered by a relative decrease in chromomere number. Thus heterochromatin is considered as a phylogenetically rudimentary chromosome substance deficient in organizing chromomeres. That heterochromatin cannot have any essential physiol. function, follows from a comparison of nearly related spp. like *Gerris lateralis* and *G. lacustris*, in one of which the X chromosome is somatically euchromatic, in the other, heterochromatic.—E. Sutton.

19435. MCCLUNG, C. E. (U. Pennsylvania.) Chromosome chronology. *Bios* 13(1): 8-12. 1942.—Presidential address at biennial convention, 1941. "Past achievements . . . constitute only a step toward future progress." Gives a challenge for "proper association of cytological and genetic data."—L. J. Gier.

19436. RICHARDS, A. GLENN, Jr., and THOMAS F. ANDERSON. (U. Pennsylvania.) Electron microscope studies of insect cuticle, with a discussion of the application of electron optics to this problem. *Jour. Morph.* 71(1): 135-177. 6 pl. 1942.—A technique is described for sectioning cockroach cuticle at fractions of a μ . Electron micrographs from sections of the pronotum of *Periplaneta americana* show that the endocuticle and exocuticle are composed of alternating dense and less dense laminae. This laminar structure disappears when the protein is removed. These layers are traversed by spiral, probably fluid-filled, pore canals averaging 0.15 μ diam. and 1,200,000 per sq. mm. No smaller structural details were resolved and indirect evidence suggests no pores larger than 0.002 μ . These layers are covered by a 2 μ thick epicuticle; in hot HNO₃ it splits into 2 layers: a colorless outer layer, approx. 0.02 μ thick after drying, and an amber-colored inner layer approx. 2 μ thick. Neither layer is penetrated by the pore canals. The larval cuticle of *Culex pipiens* lacks pore canals. The epicuticle is a single uniform layer. Expts. on penetration of non-volatile oils suggest that these diffuse through the cuticle matrix. The influence of oils on cutaneous respiration of mosquito larvae seems possibly due to permeation and partial substitution of the diffusion rate in oil for the normal permeability to these gases. A discussion is given of the application of electron optics to cuticle studies. Limitations are imposed by the high vacuum and electron effects, but the major difficulty is preparing sufficiently thin sections.—Auth. (courtesy Wistar Bibl. Serv.).

19437. RIS, HANS. (Columbia U.) A cytological and experimental analysis of the meiotic behavior of the univalent X chromosome in the berryberry aphid *Tamalia* (= *Phyllaphis*) *coweni* (Ckll.). *Jour. Exp. Zool.* 90(2): 267-326. 4 pl. 1942.—The meiosis of the ♂ presents a number of extraordinary features which seem to contradict established views of modern cytology. Most outstanding are the unparalleled stretching of the X chromosome at 1st. meiotic anaphase, the unequal division of spermatocyte I and the meiotic behavior of the autosomes. The stretching of the X chromosome at anaphase is due to the action

of the chromosomal fibers originating from the entire length of the chromosome (diffuse spindle attachment) without relaxation of the chromatid coherence. The X thus extending from one daughter plate to the other prevents the cleavage furrow from cutting through the middle of the cell and forces it to one side. Therefore one large cell containing the X and a small bud are formed. The autosomes synapse and crossing over leads to chiasmata which completely terminalize in diakinesis. The 1st division does not separate the dyads and thus break the terminal chiasma as is the case in Hemiptera and most Homoptera, but the chromatids of each dyad go to opposite poles. They remain connected at the terminal chiasma throughout this division. These chromatids pair side-by-side in the 2d prophase and disjoin at anaphase, thus completing the reduction in chromosome number.—Auth. (courtesy Wistar Bibl. Serv.).

19438. SALAZAR, A. L. (U. Oporto, Portugal.) L'Appareil Para-Golgi et les Conceptions Actuelles sur la Zone de Golgi. L'Appareil Para-Golgi répond-il à l'Idio-Golgi de Bowen? (Apparatinhalt de Hirschler, Golgi-Internum de Sembrat, etc.) *Anat. Rec.* 82(3): 309-326. 3 fig. 1942.—An interpretation of the Para-Golgi apparatus in accordance with conceptions of the Zone of Golgi. The author reaches the conclusion that the Para-Golgi apparatus corresponds to the "component idiosomique" of Bowen, the "Apparatinhalt" of Hirschler, and the Golgi Internum of Sembrat; it would be, in fact, the Idio-Golgi. The system of Golgi would be formed, in this manner, of 2 components, of 2 substances, Golgi and Para-Golgi, the former tannophobic and osmophilic and of lipoidal nature; the latter tannophilic and osmophilic, of protein nature. The tannin-iron, which colors the Para-Golgi specifically, does not color any lipoidal substance.—Auth. (courtesy Wistar Bibl. Serv.).

GENETICS

Editors: ORLAND E. WHITE, *Plant*; SEWALL WRIGHT, *Animal*

(See also Entries 19385, 19412, 19414, 19426, 19428, 19858, 19964, 20211, 20247, 20248, 20256, 20326, 20354, 20372, 20382, 20864, 20903, 20932, 20975, 20988, 21065, 21073, 21094, 21106, 21109, 21112, 21125, 21141, 21142, 21143, 21188, 21346, 21360, 21416, 21419)

PLANT

19439. ATWOOD, SANFORD S. (U. S. Region. Pasture Res. Lab., State College, Pa.) Oppositional alleles causing cross-incompatibility in *Trifolium repens*. *Genetics* 27(3): 333-338. 1942.—Two series of *T. repens* plants (10 and 17 individuals, respectively) were compatible as ♀♀ with a plant homozygous for oppositional alleles (S_1S_1). In 26 of the 27 resultant F_1 progenies of 4-8 plants each, 2 intra-sterile, interfertile groups were found, in the other progeny only 1 group was found. Within each series, diallel crosses were made for all F_1 groups, and each F_1 group or its heterozygous parent was crossed as a ♀ with 6 plants, homozygous respectively for 6 other alleles. Incompatible matings indicated that the 2 alleles being tested were identical. Of the 26 alleles tested in the 1st series, 25 proved to be different, and in the 2d series 34 of the 41 were different.—S. S. Atwood.

19440. ATWOOD, SANFORD S. Genetics of pseudo-self-compatibility and its relation to cross-incompatibility in *Trifolium repens*. *Jour. Agric. Res.* 64(12): 699-709. 1942.—The original ♀ parent of the *T. repens* plants used in this study set a large number of selfed seeds when entire heads were manipulated, but it failed to set seed when 10 flowers per head were self-pollinated by hand in the greenhouse. The ♂ parent was self-compatible. The pseudo-self-compatibility of the ♀ parent was transmitted to the F_1 , F_2 , and backcross-generation plants; it appears to be conditioned by several genes, which were additive in effect and heterozygous in the parents. Four intrsterile, interfertile groups of 4, 4, 3, and 2 plants, respectively, were found among the F_1 plants. The compatible F_1 intercrosses averaged 40.8 seeds per 10 flowers; the incompatibles averaged only 0.18. Reflection of the pedicels also was used to distinguish compatible from incompatible crosses. The diploid personate theory of oppositional allelomorphs explains these cross-incompatibilities if it is assumed that the parents differed in all 4 factors which they carried. When a further test was made by backcrossing 38 selected F_1 plants to the 2 parental and 4 F_1 groups, only the expected groups were obtained. In this way a certain genotype was assigned to each group, and the oppositional-factor hypothesis was confirmed for these pseudo-self-compatible plants. Out of 41 plants resulting from incompatible crosses of selfs, 12 proved homozygous, 18 heterozygous, and 11 contaminants. Among the 12 were the 4 possible homozygous genotypes. One of the S genes from the pseudo-self-compatible parent was identical with the S_4 previously isolated from a self-incompatible plant. When the original ♀ parent was backcrossed with the F_1 , F_2 , and homozygous plants, certain combinations failed where they were expected to be compatible, and others were compatible where they were expected to fail. All of these results are explicable if it is assumed that this original parent changed from S_1S_3 to S_4S_4 subsequent to

the original cross. This change could have resulted from either mutation or contamination in the field. Plants of both relatively high and low pseudo-self-compatibility were found in each of the 6 groups; evidently little relationship exists between the S factors and those conditioning the ability to set some selfed seed after manipulation. Pseudo-compatibility may be useful in a breeding program.—S. S. Atwood.

19441. AYYANGAR, G. N. RANGASWAMI, and A. KUNHI KORAN NAMBIAR. (Millets Breeding Sta., Coimbatore, India.) The inheritance of depth of green colour in the leaves of sorghum. *Current Sci.* 10(11): 492-493. 1941.—In the leaf of sorghum, Dark Green is a monogenic dominant to Green, and Green a monogenic dominant to Light Green; they segregate out in the ratio of 9:6:1. Two supplementary factors for chlorophyll color, C_1 and C_2 , operate. Either can deepen Light Green to Green; both of them have to be present to produce a Dark Green type.—R. A. Muttikowski.

19442. AYYANGAR, G. N., and U. A. WARIAR. Samai, the little millet *Panicum miliare*, Lamk. *Madras Agric. Jour.* 29(12): 461-470. 1941.—This millet is grown to a limited extent in all parts of India up to an elevation of 7000 ft. 589,940 acres are under cultivation in Madras Presidency. Samai is valuable because it gives crops of food-grain on land otherwise valueless; it can withstand both drought and water-logging. It takes 3½-4 months to mature, and yields 200-500 lbs. of grain and 800-900 lbs. of straw (semi-dry) per acre. Self pollination is the rule; the % of natural crossing is low (0.05). 3 genetic characters were studied: purple, medium purple, and green color of plant. Purple proved dominant to green and also to medium purple. Segregation in F_2 was in a 3:1 ratio. Medium purple crossed with green gave F_1 medium purple and in F_2 , 3:1. Factor P causes purple pigmentation on the body of the plant and stigma, giving a medium purple. Factor H is responsible for purple of the glume. H is noticeable only in the presence of P . Interplay of these factors results in a 9:3:4 ratio. Grain color: very light olive brown, light olive brown, olive brown results from the interaction of 2 additive factors I_1 , I_2 inhibiting in effect on olive-brown grain. Albinism is due to the absence of factors C_1 , C_2 . Albinos live only 10 days.—Cecil Yampolsky.

19443. AYYANGAR, G. N. RANGASWAMI, and K. KUNHI KRISHNAN NAMBIAR. (Agric. Coll., Coimbatore.) Studies in *Dolichos lablab* (Roxb.) and (L.) the Indian field and garden bean. IV. *Proc. Indian Acad. Sci. Sect. B.* 14(2): 95-113. 2 fig. 1941.—In the seed coat colors black, chocolate and khaki, 5 heritable types of localizations are met with: micropylar color, caruncular patch, dorsal patch, and the marbled and eye patterns. These arise by the interaction of the 5 factors, K , C_p , D_p , M , and B_f . By itself the factor K produces the micropylar color. If

K is associated with 1 or more of the 3 factors *C_p*, *D_p*, or *M*, the various patterns are produced. In the presence of *K* and *C_p* the factor *D_p* produces the dorsal patch while the factor *M* produces the marbled pattern. *K*, *C_p*, *D_p* and *M* combined, produce the eye pattern. The *B_f* factor which by itself produces a buff seed coat can convert any of the above patterns into a whole color. Factors *K* and *B_f* are absolutely linked. A factor *S_p* produces the smooth and even distribution of color over the seed coat. Its allelomorph *s_p* is responsible for speckling. Thus, with *K* and *B_f*, *S_p* produces a solid whole color, while *s_p* results in the speckled whole color. The factors *K*, *b_f*, and *s_p* are necessary for the production of each of the speckled patterns. Speckling can manifest itself in only black and chocolate and is not perceptible when it occurs on a khaki or buff background.—W. C. Tobie.

19444. AYYANGAR, G. N. RANGASWAMI, and N. KRISHNASWAMI. (Agric. Coll., Coimbatore.) Studies on the histology and coloration of the pericarp of the sorghum grain. *Proc. Indian Acad. Sci., Sect. B.* 14(2): 114-136, 23 fig. 1941.—The histology and organogeny of wild and cultivated races of sorghum is deser. The tube cells arise from the inner epidermis of the pericarp. The integument is from the inner integument, not from the nucellus, which is completely absorbed. Wild sorghums are brown, with an integument. The very thin pericarp consists only of epidermis, tube cells, and sometimes a very small tissue of mesocarp. Cultivated sorghums have a greater number of layers than the wild ones. The 2 main types of grains are starchy and non-starchy. The integument (generally brown) is not always present. In some crosses, the parents had no integuments at all, but the *F₁* had an integument, indicating complementary factors. In pseudomutant grains and chimeras a brown color was always associated with an integument. 13 references.—W. C. Tobie.

19445. EYSTER, H. CLYDE. Pollen tube growth of a self-sterile strain of Petunia. *Proc. S. Dakota Acad. Sci.* 21: 56-57. 1941.—The pollen-tube growth of a self-sterile strain of *Petunia* known as Golden Rose was investigated in order to determine the cause of the sterility. Pollen-tubes were grown 3 days in *Petunia* styles then killed by momentary placement in boiling water and then transferred to formalin-acetic-acid alcohol fixative. The styles were flattened out on a microscope slide stained in Acid Fuchsin to which a little Light Green had been added. The pollen-tube absorbed the stain and could be seen easily. Flowers of the self-sterile strain and of normal self-sterile strain were self-pollinated. Reciprocal crossed pollinations were also accomplished since the self-sterile strain was known to be cross-fertile. In all cases studied, except when the self-sterile strain was self-pollinated, most of the pollen tubes grew most of the way down the style in 3 days. In the mentioned exception the style dropped off before the pollen tubes could reach the ovary.—H. C. Eyster.

19446. GREENLEAF, W. H. (U. California, Berkeley.) Genic sterility in *Tabacum*-like amphidiploids of *Nicotiana*. *Jour. Genetics* 43(1/2): 69-96. 4 pl., 21 fig. 1942.—In the callus-induced amphidiploids *N. sylvestris-tomentosa* and *N. sylvestris-tomentosiformis*, meiosis is regular, pollen fertility is 93% or above, but the plants are ♀-sterile. In 4 newly produced amphidiploids, derived from newly collected races of *N. tomentosa*, the pollen is also good; 2 are completely ♀-sterile, the other 2 are partially so. This indicates that the sterility is not chromosomal but is due to the interaction of complementary genes, which apparently arrest development of the embryo sacs in the 2 to 4-nucleate stage. Kostoff's amphidiploid *N. sylvestris-tomentosiformis* is ♀-fertile. Its origin possibly involved crossing over between the genomes in the hybrid, followed by the elimination through segregation of one of the complementary sterility genes. Seed fertility in *F₁* hybrids between amphidiploids (including *N. tabacum*) indicates that the sterility genes are located on 2-3 chromosomes of each genome.—The comparison of pollen fertility counts in many related spp., vars., and hybrids, of pollen size in amphidiploids, and of morph. differences between *N. tabacum*, the amphidiploids, and the highly aberrant allo-octoploids *N. sylvestris-tomentosa* and *N. sylvestris-tomentosiformis* all confirm the conclusion that *N. tabacum* arose as an amphidiploid from *N. sylvestris*

and either *N. tomentosa* or *tomentosiformis* in S. America.—H. B. Glass.

19447. HARLAND, S. C., and OLGA M. ATTECK. (Inst. Cotton Genetics, Lima, Peru.) The genetics of cotton. XIX. Normal alleles of the crinkled mutant of *Gossypium barbadense* L. differing in dominance potency, and an experimental verification of Fisher's theory of dominance. *Jour. Genetics* 42(1/2): 21-47. 1941.—The normal allele of *cr* in *G. barbadense* is fully dominant. The normal alleles of the same mutant from *G. hirsutum* (4 strains), *G. purpurascens*, and *G. taitense*, when transferred to *barbadense* by repeated back-crossing, are not completely dominant. The normal allele of *cr* present in *G. darwinii* has dominance of similar potency to that of *G. barbadense*.—Normal alleles of *cr* transferred to *G. hirsutum* from *barbadense*, *tomentosum*, and *darwinii* were found to be fully dominant. The normal allele of *hirsutum* strain 57, dominant on its own modifier background, is not dominant in *hirsutum* str. 9; that of str. 9, not dominant on its own background, became fully dominant on that of str. 250. On the background of a super-crinkled strain, even the *barbadense* allele became incompletely dominant.—The evidence therefore exists for at least 3 normal alleles of *cr*, differing in dominance (*Cr^B*, *Cr^H*, *Cr^M*), as well as for modifier backgrounds of differing potency. In *barbadense*, *tomentosum*, and *darwinii* the evolution of dominance has been mainly that outlined by Haldane, the selection of alleles of great dominance potency, with little modification of the recessive. In *hirsutum*, *purpurascens*, and *taitense* the evolution of dominance has been that outlined by Fisher, the modification of the heterozygous and the homozygous recessive phases by the selection of dominance modifiers.—It is held that Fisher's type of dominance will arise only where there is a considerable amt. of outbreeding, as in *Gossypium*, and where the selection of modifiers of the recessive may be transferred to the heterozygote. A selective advantage of the heterozygote over the homozygous dominant, even if temporary, would also help to diffuse modifiers through the species.—H. B. Glass.

19448. HULL, FRED H., J. D. WARNER, and W. A. CARVER. Corn varieties and hybrids and corn improvement. *Florida Agric. Exp. Sta. Bull.* 355. 1-50. 24 fig. 1941.—Yield tests with corn vars. and hybrids, 1936-40, are reported on, with comments on results of earlier tests by the station and tests on private farms, descriptions of vars. of current interest, and discussions on the characteristics of a good utility type, reproduction in corn and methods of corn improvement, and the development, commercial production, and use of hybrid seed corn in Florida. Recommendations include the station hybrid Fla. W-1 (Florida White Hybrid No. 1) for highest yields and good weevil resistance in the northern half of Florida; Florident White, high-yielding with medium weevil resistance, for the part of the crop to be fed in fall or winter; and McIntosh and Munroe Little Cob, white corns of fair yield and good weevil resistance, for the part to be held in crib storage without fumigation into spring and summer. Dubose and Kilgore Improved Florida Flint with lower yields but better weevil resistance than McIntosh, and Munroe Little Cob may be preferred where weevil infestations are high. Cuban Yellow Flint is indicated in all parts of the State where extreme resistance to weevil damage is desired, but otherwise it is recommended largely for southern Florida and especially for muck lands. Florident Yellow, a high-yielding corn with fair weevil resistance, probably will be used mostly in central and n.-w. Florida for feeding livestock in fall and winter, and will also be satisfactory for silage on all mineral soils except in extreme southern Florida. Wood Hybrid Golden Prolific may be used in small plantings to provide feed for 1 to 2 weeks before later types of corn are ready to feed.—Courtesy *Exp. Sta. Rec.*

19449. KAJEWSKI, S. F. (Fruit Branch, Bowen, Queensland.) Cross breeding experiments in the Bowen district. *Queensland Agric. Jour.* 56(6): 473-476. 1941.—A tomato cross made between Buckeye-Globe and San Marzano was carried through 4 generations with improvement in fruit type, resistance to mosaic and *Fusarium* wilt disease, and with desired reduction in plant size. To improve the purple-fruited passion fruit, *Passiflora edulis*, it was crossed with the disease resistant golden-fruited Ameri-

can var., *P. incarnata*. The first crosses resulted in plants which set mostly sterile flowers. After many trials, 2 large diploid fruits were secured. Four further types of crosses resulted in 14 plants superior to *P. edulis*. 78% of the resulting plants were sterile. A virus disease resembling tomato mosaic appeared in one series.—*T. L. Bissell*.

19450. LEONARD, WARREN H. (Agric. Exp. Sta., Ft. Collins, Colo.) Inheritance of fertility in the lateral spikelets of barley. *Genetics* 27(3): 299-316. 2 fig. 1942.—The Mortoni var. of barley, classified as *Hordeum intermedium*, is a var. with partial fertility of the lateral spikelets, the average of the fertile lateral spikelets being 40.7%. Mortoni was crossed with various 6-rowed and 2-rowed barleys to determine its constitution for the non-6-row vs. 6-row (*Vv*) and intermedium (infertile) vs. non-intermedium (*ii*) factor pairs generally associated with lateral spikelet fertility. Homozygous partial lateral spikelet fertility found in the Mortoni var. appeared to be due to a fertility allele of the infertile intermedium vs. non-intermedium (*ii*) factor pair. The allelic series for intermedium appears to be *I*, *I^h*, and *i*, with infertility dominant over fertility. The non-intermedium vs. fertile intermedium (*I^h*) factor pair, from the combined *F*₂ and *F*₃ data, was found to be linked with that for hoods vs. awns (*Kk*) with $14.32 \pm 0.61\%$ recombination. Hoods vs. awns is known to be located in linkage group IV. The non-intermedium vs. fertile intermedium (*I^h*) factor pair was found to be inherited independently of factors known to be located in groups I, II, III, V, and VI. It was not tested with factors in group VII. A method of testing barley varieties for intermedium constitution is suggested.—*W. H. Leonard*.

19451. MATHER, K., and G. H. BEALE. (Johns Innes Hort. Inst., Merton, Eng.) The calculation and precision of linkage values from tetrad analysis. *Jour. Genetics* 43 (1/2): 1-30. 4 fig. 1942.—In organisms such as *Neurospora crassa*, where it is possible to analyze all 4 spores of a tetrad, more information about the linkage of genes with one another or with the centromere is obtainable than in the customary analysis where only one spore from each tetrad is sampled. The method of maximum likelihood is used to deal with the problems arising because the observations made on spores of the same tetrad are not independent. Formulae are derived (1) for estimating the recombination fraction and its variance, both with and without viability disturbances; (2) for estimating the relative values of the various types of data; (3) for combining the latter; (4) for cases of close linkage; (5) for linkage of a gene with the centromere; (6) for calculating coincidence values and their variances. Arithmetical illustrations are drawn from *Neurospora* data.—*H. B. Glass*.

19452. PERERA, P. R. (Tea Res. Inst. Ceylon, St. Coombs, Talawakelle.) A non-fermenting type of the tea plant, *Camellia thea*, Link. *Current Sci.* 10(11): 485. 1941.—A non-fermenting character was found in each of 2 bushes originating from the same split seedling. This reveals the presence of a genetical factor for fermentation. There are many types of tea ranging from non-fermenting through poor and medium types to very rapid fermentation; this factor is connected with an oxidizing enzyme system.—*R. A. Muttikowski*.

19453. PLATT, A. W., and J. G. DARROCH. (Dom. Exp. Sta., Swift Current, Sask.) The seedling resistance of wheat varieties to artificial drought in relation to grain yield. *Sci. Agric. [Ottawa]* 22(9): 521-527. 1942.—The reaction of wheat vars. to artificial drought in the seedling stage was studied in greenhouse expts. Periods of permanent wilting of from 12 to 19 days resulted in differential survival among the vars. studied. Statistically significant coefficients of correlation were established between survival from artificial drought, and yield as detd. in field tests. Such drought tests would be useful in eliminating low yielding plants or lines from hybrid populations.—*A. W. Platt*.

19454. SARTORIS, GEORGE B. (Bur. Pl. Indus., Washington, D. C.) Longevity of sugarcane and corn pollen—a method for long-distance shipment of sugarcane pollen by airplane. *Amer. Jour. Bot.* 29(5): 395-400. 1942.—The pollen of sugarcane (*Saccharum spontaneum*) and Golden Cross Bantam corn were stored at 4° and 7° C. and at rel. humidities from 37 to 100%. Pollen stored at rel. humid-

ities of 39 to 52% or over CaCl₂ remained viable for 1-2 days, at 70-80% for 4-6 days, and at 90-100% for 8-10 days. The viability was tested by germinating the pollen on artificial media composed of 1.5% agar and 25% sucrose for the sugar cane pollen and 1.5% agar and 18% sucrose for the corn pollen. Best results were obtained when the pollen was sown as soon as the agar jelled, and when there was no condensation water on the surface of the agar. Sugar cane pollen stored for 4-7 days retained its ability to fertilize and it produced as much seed as fresh pollen. A method of packing sugar cane pollen for long-distance shipment by airplane is deser.—*G. B. Sartoris*.

19455. WINGE, Ø., and O. LAUSTSEN. On a cytoplasmatic effect of inbreeding in homozygous yeast. *Comp. Rend. Trav. Lab. Carlsberg [Copenhagen] Sér. Physiol.* 23: 17-19. 1940.—When sister spores from the same ascus of the heterozygous *Saccharomyces cerevisiae* var. *ellipsoideus* (Danish baking yeast), form spore zygotes giving rise to a new generation of yeast, this shows a universal inbreeding degeneration revealing itself in a perceptible reduction of the germination % of the spores. When the single spores of baking yeast found a new generation, the extent of inbreeding degeneration greatly depends on the way in which the yeast diploidizes. The degeneration from diploidization by fusion between 2 haploid cells and their nuclei is insignificant in comparison with that from "direct diploidization," i.e., by fusion of mother- and daughter-nucleus in the germinating spore. In the latter instance is produced a yeast with spores, which, when isolated, exhibit a much reduced germination power little short of sterility. Production of dry matter is reduced in yeast types originating from single spores, especially in types arising from direct diploidization. Expts. with homozygous types of baking yeast confirm that the manner of diploidization plays an important part and that a further degeneration may take place in the following generations of a pure homozygous line of yeast. This degeneration must be due to the cytoplasm, probably the chondriosomes in particular. It is suggested that chondriosomes contribute genetic material of significance to the vigor of the type. The chondriosomes do not appear de novo, but only at divisions at about the same time as the nuclear divisions. The above-mentioned hypothesis explains the pronounced degeneration in types originating from direct diploidization. A similar degeneration does not exist in *Saccharomyces validus*. Hence the division of the chondriosomes is here supposed to be slightly earlier than the nuclear division in the germinating spore of the baking yeast. In conformity with the fact that *Zygosaccharomyces* are to be expected usually to occur as pure lines, *Zygosaccharomyces priorianus* shows no inbreeding degeneration. No direct diploidization has been observed in this species. The inbreeding degeneration, which has been demonstrated in pure lines and must be of cytoplasmatic nature, probably has a more general interest genetically in contributing to the understanding of inbreeding in general, which so far could not be explained satisfactorily on the basis of the interplay of the chromosomal genes.—*W. M. Sperry*.

ANIMAL (EXCEPT MAN)

19456. ASMUNDSON, V. S. (U. California, Davis.) Crossbreeding and heterosis in turkeys. *Poultry Sci.* 21 (4): 311-316. 1942.—The Black var. was crossed with 2 medium-sized vars., the Black-winged Bronze and White, and with 2 smaller vars., the Bourbon Red and the Lilac, of about the same wt. as the Black. The wts. for the limited number of birds available in the 5 hatches used were corrected to those of the 3d hatch and rate of growth was calculated from the means of these corrected wts. Heterosis was most pronounced for the progeny of the Black \times Bourbon Red ♂ which, like the progeny of Black \times Lilac ♂, weighed more than the parental vars. at 8 weeks and thereafter. The wts. of the progeny of the Black mated with White or with Black-winged Bronze exceeded those of the Black parent at all ages but did not differ significantly from those of the larger parent. The wts. of the crossbreds were less variable than those of the parents, as measured by the coeff. of variation.—*V. S. Asmundson*.

19457. BARTOLINI, MARIA LUISA. (U. Bologna.) Ricerche sulle produzioni tegumentarie, del capo e del

collo di alcuni Gallinacei. [With Eng. summ.] *Arch. Zool. Ital.* 26: 175-192, 2 pl. 1939.—Observations on various spp. of gallinaceous birds have indicated the factors responsible for the different pigmentation types in the cutaneous productions of the head and neck. The red color can be determined either by carotinoid pigment with different aspect and distribution or by a particular disposition of the blood vessels; the blue, violet and blackish color by melanophores diversely ramified and arranged in different pattern; and the yellow-whitish color is given by the remarkable thickness of the dermal tissue and sometimes of the horny layer overlying the melanophores. Special attention is given the differences in the characters between the various species of the pheasants which are concerned in the present work.—*From auth. summ.*

19458. CASTLE, W. E. (U. California.) Size genes of mice. *Proc. Nation. Acad. Sci. U.S.A.* 28(3): 69-72. 1942.—The mutant gene, pink-eye, decreases general body size in mice less than lethal yellow increases it, as regards both wt. and body-length, but not as regards tail-length.—*Auth. abst.*

19459. DARLINGTON, C. D. (John Innes Hort. Inst., London), and TH. DOBZHANSKY. (Columbia U.) Temperature and "sex-ratio" in *Drosophila pseudoobscura*. *Proc. Nation. Acad. Sci.* 28(2): 45-48. 1942.—The "sex-ratio" gene or complex in the X-chromosomes of many *Drosophila* spp. causes the X-chromosome to divide twice at meiosis in the ♂ while the Y is thrown out. This abnormality seems to depend on an excessive nucleic acid charge and should therefore (on other evidence) be affected by temp. This expectation was confirmed. The proportion of sperm was reduced from 99 to 94% by raising the temp. from 16° to 25°C.—*Auth. abst.*

19460. FANO, U. (Carnegie Inst. Washington, Cold Spring Harbor, N. Y.) An autosomal recessive factor inducing semisterility in *Drosophila melanogaster* females. *Proc. Nation. Acad. Sci. U.S.A.* 28(4): 119-123. 1942.—A wild type strain, most of whose eggs failed to develop, has been isolated. Breeding expts. indicate that this behavior is due to a 2d-chromosome factor which affects the offspring of homozygous parent ♀♀ independently of the genetic constitution of their mates.—*Auth. abst.*

19461. GRÜNEBERG, H. (Univ. Coll., London.) The anaemia of flexed-tailed mice (*Mus musculus* L.). I. Static and dynamic haematology. *Jour. Genetics* 43(1/2): 45-68. 1 fig. 1942.—In the anemia of flexed-tailed mice (recessive f), the red blood cells are of normal size but are low in Hb conc. The pathological process is limited to embryonic hemopoiesis, ceasing by the beginning of the 3d week after birth, although pathological cells remain in the circulation up to 6 weeks. After these disappear the blood picture of anemics is entirely normal. The substitution of normal for pathological cells takes place during a transition period when cells of intermediate grades of abnormality are produced.—*H. B. Glass.*

19462. KIMBALL, R. F. (Johns Hopkins U., Baltimore.) The nature and inheritance of mating types in *Euplotes patella*. *Genetics* 27(3): 269-285. 1942.—The 6 mating types found in *E. patella* were shown by breeding expts. to be detd. probably by a series of 3 allelic genes designated mt^1 , mt^2 , mt^3 . 3 of the types are homozygous, each for a different allele; 3 are heterozygous, each for a different combination of alleles. Animal-free culture fluid from any of the heterozygous types induces conjugation among animals of any of the other 5 types. Animal-free fluid from any homozygous type induces conjugation only among animals which do not have an allele in common with the animals from which the fluid was taken. These results can be explained on the hypothesis that each allele is responsible for the production by the animal of a conjugation-inducing substance which causes conjugation to occur among animals which do not produce this substance. As might be expected, the number of pairs in mixtures between heterozygous animals and homozygous ones with which they have an allele in common is fewer in general than that in other mixtures. Various types of exceptional occurrences—conjugation in unmixed samples of animals from one culture, conjugation in mixtures of animals presumably of the same type, and failure of conjugation in mixtures where it would be expected—were reported, and suggestions made as to their causes.—*R. F. Kimball.*

19463. KRAMER, GUSTAV. Über das "Concolor"-Merkmal (Fehlen der Zeichnung) bei Eidechsen und seine Vererbung. *Biol. Zentralbl.* 61(1/2): 1-15, 11 fig. 1941.—In *Lacerta fumana* and *L. serpa* self-color is a simple autosomal recessive trait in contrast to the dominant color pattern of light and dark spots on a greenish or brown-gray background. A successful species cross gave a single vigorous F₁ hybrid ♂ which in a back-cross produced progeny that indicates the gene concolor is homologous in the 2 species.—*A. H. Hersh.*

19464. LEES, A. D. (Cambridge U.) Operations on the pupal wing of *Drosophila melanogaster*. *Jour. Genetics* 42(1/2): 115-142. 1 pl., 16 fig. 1941.—Permanent effects are produced following the puncturing of developing prepupal wings only in the period from 0-25 hrs. after pupation, at 25°C. In the 0-3½ hr. period the effects found include (1) scalloping, in 5% of operated wings, probably due to alteration in the position of the invaginating wing-fold and displacement of the already determined margin and veins onto the wing surface, where they are abolished; (2) disrupted venation, a branching of L₃, L₄, and L₅, due to a shifting of the dorsal wing surface relative to the ventral, after the former has commenced to induce the veins on the latter; (3) fused bases of L₃ and L₄; (4) absence of a section of a vein, usually L₃; (5) large blisters, probably due to failure of the wing surfaces to adjust themselves after contraction.—Operations in the 3-6½ hr. period produce characteristic short round wings, due to some inhibition of the cell multiplication normally occurring at this time and to the exaggeration of the contraction from the inflated stage ("dumpy process"). Vein L₂, formed differently from the other veins, can be modified up to this time.—Operations from 6-21 hrs., when the wing is very inflated, produce (1) large holes in the epithelium, distortion of the wing outline, and local or widespread crowding of cells, due to a decrease in marginal resistance (dumpy phenomenon) and to an increase in epithelial tension; (2) extra vein material, like Delta, near wounds.—Chordotonal organs distal to the site of injury are formed after operations from 5 hrs. on, but not during 0-3 hr. period, so that they must be already detd. after 5 hrs., and their differentiation seems to depend on the integrity of the nerve innervating them.—The position of the posterior cross-vein can be altered up to 21 hrs. and produced from material normally intervein in character. This is not true of the anterior cross-vein.—*H. B. Glass.*

19465. PICKARD, J. N. (Inst. Animal Genetics, Edinburgh, Scot.) Waved—a new coat type in rabbits. *Jour. Genetics* 42(1/2): 215-222. 1 pl. 1941.—Waved coat in rabbits is due to an autosomal recessive gene, manifested only in Rex types, but commonly carried in exhibition Angoras and descendant strains. Modifying factors were found. Waved is not linked with blue or brown coat colors. Waved young frequently molt with exceeding rapidity, becoming temporarily naked.—*H. B. Glass.*

19466. PIPKIN, SARAH BEDICHEK. (N. Texas Agric. Coll., Arlington.) Intersex modifying genes in wild strains of *Drosophila melanogaster*. *Genetics* 27(3): 286-298. 1942.—A study was made of intersex sex-type-modifying genes located in the X chromosomes of 20 wild stocks collected from widely varying geographical regions—Amherst, Massachusetts; California; Canton, Ohio; Florida; Formosa, Japan; Lausanne, Switzerland; Seto, Japan; Sweden; Tuscaloosa, Alabama; Urbana, Illinois; Woodbury, N. J.; Caddo Lake, Texas; Uvalde, Tex.; Henderson, Tex.; Lubbock, Tex.; Dallas, Tex.; Fort Worth, Tex.; and Mexico (2 stocks from different regions). Males of each wild stock were crossed with y^2 v f triploid ♀♀ of a highly inbred line. After environmental influences upon intersex sex type had been excluded, sex types of wild type and y^2 v f sib intersexes were compared by reference to the χ^2 distribution. 11 of the 20 wild stocks possessed X chromosomes containing intersex modifying genes of a different potency and dominant over their alleles in the y^2 v f X chromosome of the triploid stock.—*S. B. Pipkin.*

19467. REED, S. C., C. M. WILLIAMS, and L. E. CHADWICK. (Harvard U.) Frequency of wing-beat as a character for separating species races and geographic varieties of *Drosophila*. *Genetics* 27(3): 349-361. 1942.—The Edgerton stroboscope provides a precise method for determining the number of wing-beats per min. of strains of

Drosophila. Under standard conditions each species has a characteristic range of wing-beat frequencies. Though the av. difference between various strains of Race A and Race B of *D. pseudoobscura* is only 470 double wing-beats per min., this difference is 7.34 times its standard deviation. Of the several geogr. vars. of *D. pseudoobscura* tested, the fastest of Race A flew at 11,470 beats per min. and the slowest of Race B at 10,140; this wide range of frequencies allows one to distinguish physiologically different geogr. strains with ease. Reciprocal hybrids and backcrosses to both fast and slow parental strains were secured and showed that the wing-beat frequency is under exact genetic control and that the number of factor pairs concerned is probably not large. The differences in wing-beat frequency between spp., races and geographic vars. were found to rest in large part upon a striking morphological relationship. This relationship is between the muscle-mass of the thorax which is responsible for wing motion and the area of the wings. If the muscle-mass be held constant, the frequency of wing-beats increases uniformly as the wing area, and hence the air resistance, decreases. The genetic changes which have separated strains of *Drosophila* in regard to the "physiological" wing-beat character are therefore gene changes affecting primarily the proportional relations between wing muscle and wing area.—Authors.

19468. SMYTH, J. D. (Trinity Coll., Dublin.) Nomenclature of fowl genetics. *Nature [London]* 148(3765): 781. 1941.—The gene, character, and citation are tabulated for 13 characters.—E. D. Crabb.

19469. SOKOLOVSKAIA, I. I. [Application of serological methods in investigation of incompatibility in distant crosses.] [With Eng. summ.] *Trudy Instituta Genetiki*

(*Bull. Inst. Genetics*) 13. 249-276. 7 fig. 1940.—Antibodies to the spermatozoa of different spp. and a high antiembryonic titer of the blood of ♀ goats pregnant with hybrid embryos are taken as indications of incompatibility between the different spp.—Courtesy *Exp. Sta. Rec.*

19470. TIMOFEEFF-RESOVSKY, H. A. Temperatur-modifikabilität des Zeichnungsmusters bei verschiedenen Populationen von *Epilachna chrysomelina* F. *Biol. Zentralbl.* 61(1/2): 68-84. 12 fig. 1941.—The color pattern consists of 6 pairs of black spots on the yellow-red elytra. Lighter rings are present about the spots (ocelli); between the spots the more diffuse black pigment may become heavily marked (costae); the spots may fuse (confluens). In stocks from Constantinople, Egypt, Corsica, Palestine, Arabia, Algeria, Rome, Corfu, Split, and in *E. capensis* from Cape Town, an increase in temp. over the range 20°-35°C reduces the amount of black pigment. The temp.-effective period occurs during the prepupa and the beginning of the pupa stage. At this time during development body size is not affected by the change in temp.; moisture, light and food have no noticeable effect on the color pattern. While the increase in temp. reduces the amt. of black pigment, the relative rate of its reduction in the separate pairs of spots differs, and is specific for the different races. The form of the spots (length/breadth index) is affected by temp., but the form tendency, i.e., the relation between form and size, of the separate spots remains unchanged. The form and size changes in the ocelli parallel those of the corresponding spots. The costae are also markedly reduced by increase in temp. Comparisons between forms from diverse climatic regions need to take into account the variation of the separate elements in the color pattern.—A. H. Hersh.

APPARATUS AND TECHNIQUE

PETER GRAY, *Editor*

(See also Entries 19436, 20466, 20555, 20626, 20634, 20939, 20987, 21019)

LABORATORY APPARATUS

19471. FANTL, P. (Baker Inst. Med. Res., Melbourne.) A simple weight-burette for use in organic analysis. *Australian Jour. Exp. Biol. and Med. Sci.* 19(4): 279-280. 1 fig. 1941.—A tap-less weight-burette operated by compressed air is described as employed in the estimation of the equivalent weight of sterol esters by the saponification method; using 100 mg. substance.—P. Fantl.

19472. PEMBLE, CARL A. (Patented by). Oxygen-supplying compositions suitable for use in water containing live fish. U. S. 2,245,495, June 10.—A hard, self-sustaining porous mass capable of steadily evolving O₂ over a long period of time when placed in water, the evolution being without appreciable disintegration of the mass and without contamination of the water sufficient to injure fish in the water in which the mass is placed, contains a peroxide of Be, Mg, Ca, Zn, Sr, Cd or Ba, and a primary phosphate of a metal of the group, there being 1 to 2 moles of the peroxide present for every mol. of the phosphate, these ingredients being compacted under a sufficiently heavy pressure to form a rigid porous body that is capable of retaining its shape and porosity in water and of entraining solid products of reaction, during and after reaction in water.—Courtesy *Chem. Abst.*

19473. SPENCER, G. J. (U. Brit. Columbia.) Lead or tin tubes in a biological laboratory. *Canadian Ent.* 73(3): 54. 1941.—"Ophthalmic tin tubes with noses"—lead tubes resembling tooth-paste tubes but with $\frac{1}{2}$ - to 1-in.-long screw-top snouts, obtainable from druggist's supply firms, are filled (from the butt ends, which are open in the tubes as purchased) with oil, Canada balsam, cedar oil, liquid glue, paste, petrolatum, and other laboratory materials of like consistency, and issued to students instead of dropping bottles; they are cleaner and more convenient than the bottles.

19474. WILLIAMS, W. O. (U. Calif., Davis.) A sensitive humidistat. *Science* 95(2463): 283-284. 1 fig. 1942.—Operated by the differential in temperatures between ether-filled wet and dry bulbs. The difference in vapor pressures of ethyl ether contained in the bulbs displaces a mercury column

across platinum contacts sealed in the connecting tubing. In a closed constant-temp. room, control has been obtained well within 1% rel. humidity.—M. A. Raines.

19475. ANONYMOUS. Polarimeter. *Indust. Equip. News* 10(2): 39. 2 fig. 1942.—Optical rotation of light through sample reads on a dial. The dial is marked in 5-deg. intervals, and a drug that operates in connection with it is graduated in 0.1° divisions. Supplied with an orange filter to permit use of a tungsten lamp as the light source, and with one 200-mm. sample tube. Manufacturer: Spencer Lens Co., 27 Doat St., Buffalo, N. Y.—M. A. Raines.

19476. ANONYMOUS. Photoelectric elements. *Indust. Equip. News* 10(2): 57. 1 fig. 1942.—Weston Photronic self-generating photoelectric cells are now available, in a variety of sizes, shapes and characteristics to meet specified requirements for output, resistance, spectral response. Single and multiple-cell circuits are available on a common electrode. Assembly is in housings designed for given types of service. Manufacturer: Weston Electric Instrument Co., 610 Frelinghuysen Ave., Newark, N. J.—M. A. Raines.

19477. ANONYMOUS. Refrigerating cabinet. *Indust. Equip. News* 10(3): 21. 1 fig. 1942.—A self-contained unit available in 3 and 6 cu. ft. capacities; equipped with a sealed condensing unit and a control to maintain temps. between +5° and -10° F. A special control can be specified for temps. between +20° and -35° F. Can be fitted with racks or shelves, for production or laboratory use. Connects to a standard electric outlet at point of use. Manufacturer: Jewett Refrigerator Co., 222 Letchworth St., Buffalo, N. Y.—M. A. Raines.

MICROSCOPY AND TECHNIQUE

19478. ANDERSON, T. F. (RCA Labs., Camden, N. J.), and A. G. RICHARDS, Jr. (U. Pennsylvania). Nature through the electron microscope. *Sci. Month.* 55(2): 187-192. 7 fig. 1942.—A popularized account of some of the arthropod structures that have been examined with the electron microscope. Otherwise unpublished figures are tracheae and air-sacs of the Rose Chafer (*Macrothelyus subspinosus*), hollow setae with partly hollow barbs from

the anal brushes of mosquito larvae (*Culex pipiens*), a piece of the egg shell of the same species of mosquito, and representative pieces of a spider's web (*Agelenopsis* sp.). These show that setal barbs are as small as 0.04 μ , that some regular thickenings on egg shells are only 0.02 μ , and that the basic threads of spider webs are only 0.03 to 0.05 μ broad. Figures also published elsewhere show a section of cockroach cuticle (*Periplaneta americana*), a piece of trachea from a mosquito larva (*C. pipiens*) and a fragment of one of the iridescent scales of the brilliant blue butterfly *Morpho cypris*.—A. G. Richards, Jr.

19479. BARTLETT, L. M. (Massachusetts State Coll.) A dehydration and embedding schedule for insects. *Ent. News* 53(4): 109-110. 1942.—Dehydration accomplished by the use of a series of mixtures of ethyl and N-butyl alcohols, to 2 steps of which is added a small amt. of phenol, appears to be superior to either a graded series of ethyl alcohols or dioxan for sectioning entire insects. It is suggested that fixation be accomplished by immersion in hot water for $\frac{1}{2}$ minute, followed by a fixative containing nitric acid (Gilson's). These recommendations have been made from the study of over 200 slides of immature mayflies prepared by these methods.—L. M. Bartlett.

19480. CHEN, TZE-TUAN. (U. California, Los Angeles.) A staining rack for handling cover-glass preparations. *Stain Technol.* 17(3): 129-130. 1 fig. 1942.—This porcelain staining rack, consisting of 3 rods held together by 2 end pieces, holds 12 cover glasses. Slots are conveniently spaced to accommodate 22 mm. circular cover glasses preferably. Each end-piece has hole near the top for inserting wire tongs used in removing rack from Stender dish. This staining rack may be purchased from Arthur H. Thomas Co., W. Washington Sq., Phila., Pa.—C. G. Kadner.

19481. DAWES, BEN. (King's Coll., at Univ., Bristol.) Use of the camera lucida for transcribing diagrams. *Nature [London]* 149(3770): 140. 1 fig. 1942.

19482. HARRIS, T. M. (U. Reading.) A substitute for glycerine as a mounting medium. *Nature [London]* 149(3785): 554. 1942.—A nearly saturated soln. of CaCl_2 is used instead of 50% glycerine for plant tissues. Such stains as Sudan III, alcoholic phloroglucin and iodine may be used, but not alkalis or sulfates.—E. D. Crabb.

19483. KAUL, K. N., B. MUKERJI, and R. B. CHOPRA. (Biochem. Stand. Lab., 110 Chittaranjan Ave., Calcutta, India.) An indigenous mounting medium for microscopic work. *Current Sci.* 10(11): 486-488. 1941.—Mounting media are imported and difficult to obtain. Hence "Gurjan" balsam (from oil of *Dipterocarpus levis*, *D. alatus* and *D. turbinatus*), Dammar balsam (from species of *Shorea*, *Hopea* and *Balanacarpus*, family Dipterocarpaceae) and rosin from turpentine (*Pinus longifolia*, *P. excelsa* and others in India) were tried and compared with imported media. Gurjan balsam proved unsuitable because of the high oil content; a mixture of Dammar and rosin in xylol or benzol was very efficacious.—R. A. Muttikowski.

19484. KIRKPATRICK, J., and A. C. LENDRUM. (U. Glasgow.) Further observations on the use of synthetic resin as a substitute for Canada balsam. Precipitation of paraffin wax in the medium and an improved plasticiser. *Jour. Path. and Bact.* 53(3): 441-443. 1941.—The use of

polystyrene as a substitute for Canada balsam demands the presence of a plasticiser and the complete removal of paraffin from the slide. Dibutylphthalate is suggested as plasticiser. The resultant medium is better and cheaper than balsam.—Authors.

19485. LILLIE, R. D. (Nation. Inst. Health, Bethesda, Md.) Studies on polychrome methylene blue. II. Acid oxidation methods of polychroming. *Stain Technol.* 17(3): 97-110. 1942.—The action of $\text{K}_2\text{Cr}_2\text{O}_7$, Ag_2O , KMnO_4 , HgO and NaIO_3 in polychroming methylene blue is explored. The last 2 have no action in neutral or acid methylene blue solns. With the other 3 reagents the amt. of polychroming, as measured by the shift in the absorption spectrum, is roughly proportional to the amt. of oxidant used. Various lots of methylene blue produce similar products with similar proportions of $\text{K}_2\text{Cr}_2\text{O}_7$. With similar quantities of this reagent similar products are produced by polychroming at 100°, 80°, 70° or 60° C. At 100° C the action of $\text{K}_2\text{Cr}_2\text{O}_7$ or of Ag_2O appears to be completed in 15 mins. In $\text{K}_2\text{Cr}_2\text{O}_7$ polychroming H_2SO_4 can be substituted for HCl , and subsequent BaCO_3 neutralization removes the salts formed and prevents accidental alkali polychroming. $\text{K}_2\text{Cr}_2\text{O}_7$ polychroming produces products with narrower absorption bands than alkali polychroming.—Auth. abst.

19486. METTLER, FRED A., and RUTH E. HANADA. (Columbia U.) The Marchi method. *Stain Technol.* 17(3): 111-116. 1942.—An investigation has been made of the poor penetration obtained by the Marchi method. Use of surface-tension depressants or perfusion technics showed no marked improvement. Opt. results cannot be achieved with slices of tissue > 3 mm. thick. Another cause of faulty staining is the failure to maintain an adequate strength of OsO_4 in the Marchi mixture. The conc. of this chemical should never be allowed to drop below 0.25%. A chemical method for deter. the amt. of OsO_4 present in the staining mixture and based upon the Alvarez test is descr. This method can also be utilized to reclaim partially exhausted staining solns. Remarks are included upon the KIO_3 meth. of Busch.—Auth. abst.

PHOTOGRAPHY

19487. COFFEY, LARDNER A. (Mayo Clinic, Rochester, Minn.) A combined polarizing screen and light unit. *Jour. Biol. Photogr. Assoc.* 10(3): 121-122. 1 fig. 1942.—Using a polarizing screen over the light source removes glare in photographing wet specimens. Construction details are given.—J. M. Cribbins.

19488. MILLER, WARD L. Color photography in the teaching of plant anatomy. *Proc. S. Dakota Acad. Sci.* 21: 78-80. 1941.—In addition to color advantage over the $3\frac{1}{4} \times 4$ -inch lantern slide, the 2×2 -inch Kodachrome slide requires less space for storage but does not yield quite as sharp a screen image as the larger slide. The present cost of a finished $3\frac{1}{4} \times 4$ inch slide is about 12¢ plus the photographer's time required for developing, fixing, washing, and drying both the negative and positive, and for masking and binding the latter. The cost of Kodachrome slide is about 18¢ plus time, which is a smaller item in this instance, since development is done by the manufacturers.—H. C. Eyster.

HUMAN BIOLOGY

EARL W. COUNT, *Editor*

(See also Entries Biological basis for ethics, 19381; Fatigue studies among "share croppers," U. S., 19511; Racial diff. in skin pH, 19600; Tuberculosis in negroes, 19705; Dietary deficiencies in India, 19723; Effect of high-school lunch, 19726; Hypopituitary dwarfism, 19874; Deafness in population, 19976; Electrocardiogram studies, India, 20076; Rickets in the Negro, 20236; Dental caries in African Negroes, 20631; Housing and health, 20642; Public health and medical services in India, 20644; Causes of death, 20674; Tuberculosis in mental hospitals, 20675; Human factors in parasite ecology, 21242)

POPULATION, FERTILITY, VITAL STATISTICS

19489. BÖHM, H. Krieg und Bevölkerungspolitik. *Zeitschr. ärztl. Fortb.* 38: 313. 1941.—The author analyzes the German war losses up to 1941, and concludes that they are matched by the birth rate.

19490. ANONYMOUS. Vital statistics of the United States, 1939. Part. I. Place of occurrence. II. Place of

residence. Part I. 531p.; II. 283p. U. S. Government Printing Office: Washington, 1941. Part I. Pr. \$1.50. Part II. \$1.25.—Here we have the maximum of economy and efficiency of presentation of our nation's births and deaths. The arrangement is logical and convenient, permits easy finding and use of the tabulated facts and rates based upon them. The introductory pages are adequately explanatory and, dealing

as they do with the two major topics of natality and mortality by place of occurrence and place of residence separately, the text is more direct and comprehensive than in some earlier volumes. The natality and mortality data for the United States, tabulated by place of occurrence and by place of residence, with supplemental tables for Hawaii, Puerto Rico, and the Virgin Islands, are a priceless addition to a shelf of equally precious predecessors. These two volumes are more convenient to handle, save more lost motion and waste of eyesight than any of their predecessors, while presenting practically all the essential data other than such as may properly be classed as hand-picked and of a research nature. The supervision of Dr. Halbert L. Dunn, the Chief Statistician for Vital Statistics, is of itself a guarantee of the scholarship of the brief, succinct text and the authenticity of the tabular matter.—*Haven Emerson* (in *Amer. Jour. Publ. Health*.)

BEHAVIOR

19491. BURROW, TRIGANT. Neurosis and war: A problem in human behavior. *Jour. Psychol.* 12: 235-249. 2 fig. 1941.—"There exists a fundamental and consistent integration of the phyloöorganism of man as of other species, and by virtue of this functional integration the individuals of the species are coördinated into a unitary whole as they are coördinated into a phyloöorganismic relation to the environment through the function of homeostasis. Health and the unity of function of the individual organism are maintained through the equal coöperation of all its parts, organs, and tissues. A specialization or partialization within any area, organ, or segment at the expense of other areas or organs means disease or inadequacy of function of the organism as a whole. This situation existing ontogenetically has its counterpart in the phylogenetic processes of man. . . . As within the individual organism so within the community or race, a specialization or overactivity of a part-function or segment, at the cost of other functional parts or segments, entails a condition of disease. Such a specialization is presented in the partitive pattern of reaction subjectively enacted today in the substitutive systematization of behavior we see expressed in man's affecto-symbolic alternatives of right and wrong. Man's real quarrel is with himself and his own divisive conditioning. . . . In the social and political revolution that threatens the foundations of man's world today the hostility of both belligerents belongs to the partitive level of adaptation characteristic of the social reaction-average. . . ." On the experimental side, the two levels of behavior, in so far as the individual is concerned, show up in patterns of eye-movements in the two conflicting patterns of reaction between the "partitive (normal) . . . with its motivation in the symbolic dichotomy of right and wrong, and . . . the pattern of reaction that is concomitant in the organism's primary homeostatic balance of function. . . ." The latter the author calls co-tention, the former di-tention. Co-tention shows fewer fixations in movement, with longer durations per fixation. Expts. now in progress indicate also differences in brain-wave pattern between co-tention and di-tention.—*E. W. Count.*

ALCOHOLISM, DRUG ADDICTION

19492. CHOPRA, R. N., G. S. CHOPRA, and I. C. CHOPRA. (*Sch. Trop. Med., Calcutta.*) Cannabis sativa in relation to mental diseases and crime in India. *Indian Jour. Med. Res.* 30(1): 155-172. 1942.—Investigations on 600 cases of hemp drug insanity revealed that acute mental disorders were more frequent than chronic disorders (76.6 per cent against 23.4 per cent only), acute confusional insanity alone being present in 33.3 per cent of cases. Sixty-six per cent of cases presented the history of indulgence in only hemp drugs, the rest having other vices as well. More than half the cases in this series occurred amongst the beggars, sadhus, traders and labourers, between the ages of 21 to 40 years. The relative frequency of symptoms was found in the following order: incoherent speech, 280 cases, destructive and homicidal tendencies 225 cases, insomnia 225 patients. About 58.3 per cent of recovery took place within 18 months of stay in the hospital and 5.8 per cent died. Ganja and charas addicts were found to be more susceptible to homicidal tendencies than the habitués of bhang.—*R. N. Chopra.*

19493. DAYTON, NEIL A., MERRILL MOORE, DOROTHY A. KUNBERGER, and M. GENEVA GRAY. Alcoholism and mental disorder in Massachusetts, 1917-1933. *Quart. Jour. Stud. Alcohol* 3(1): 50-64. 1942.—In 56,579 first admissions to mental hospitals in Mass., 32% of ♂♂ were intemperate drinkers, 33% temperate, 34% abstinent. ♀♀ (with lower admission rates) show about $\frac{1}{2}$ the intemperance. During 1917-1933, chronic alcoholism showed a high point the first year, a low point in 1920. The prohibition period showed a reduction of drinking among the mental cases—in spite of the unemployment period from 1923 onward. Chronic alcoholism shows highest incidence in the aet. 30-60 period (peak, 40-49) in both sexes; though ♀ incidence is only $\frac{1}{2}$ the ♂. Unmarried individuals are low in chronic alcoholism. Negative correlations show between education and intemperance; between high economic status and intemperance. Rural pop. is low in intemp., urban pop. the reverse. Foreign-born of both sexes are relatively high in chronic alcoholism; purely native-born are relatively abstinent.

19494. MILLER, MARTIN H. (*Western Reserve U.*) Arrests for intoxication in Cleveland, Ohio. *Quart. Jour. Stud. Alcohol* 3(1): 34-44. 1942.—The community has a selfish interest in curbing the extent of intoxication because of its tremendous cost in tax monies and in destruction and wasteful diversion of human energy. In Cleveland, a city of less than 900,000 population, there were more than 400,000 arrests for intoxication in the past 14 years. As a first step in meeting constructively the community problems arising from widespread intoxication, Miller attempted to identify the characteristics of the problems as they related to the governmental, social, and health institutions of Cleveland. It is suggested that the haphazard treatment of persons arrested for intoxication be discarded and that current expenditures be directed to a program of rehabilitation, medical, psychiatric and social for those in need of treatment.—*M. H. Miller.*

19495. MOROS, NATHAN. (*United States Veterans Admin. Facility, Northport, L. I.*) The alcoholic personality. A statistical study. *Quart. Jour. Stud. Alcohol* 3(1): 45-49. 1942.—A study was made of all World War Veterans admitted to the U. S. Veterans Administration Facility, Northport, L. I., between January 1, 1936 and July 1, 1939. The frequency of alcoholism, psychopathy and psychoneurosis among Jews, Italians, Irish, and Americans of the third generation and up was compared. Chronic alcoholism was found to be prevalent in the last two groups and rare in the first two. The frequency of psychopathy in the different groups, however, showed no relation to the prevalence of alcoholism. The frequency of psychoneurosis was found to be highest in the nondrinking groups. In the drinking groups, however, chronic alcoholism was frequently associated with psychoneurosis and psychopathy. This study tends to corroborate the opinion held by many psychiatrists that chronic alcoholism is usually a symptom of a more basic disorder. This symptom is common in certain racial groups and rare in others. The label of chronic alcoholism as a primary mental diagnosis appears to be rarely justified.—*Nathan Moros.*

19496. THOMAS, JACKSON M. Alcoholism and mental disorder. *Quart. Jour. Stud. Alcohol* 3(1): 65-78. 1942.—The literature regarding mental disorder as related to alcoholism is briefly reviewed. Case histories are presented which exemplify the major types of mental disease resulting from chronic alcoholism such as delirium tremens, pathological intoxication, alcoholic hallucinosis and true alcoholic psychosis. The psychopathology of alcoholism is discussed from the point of view of Abraham's and Freud's formulation.—*J. M. Thomas.*

MISCELLANEOUS

19497. NISSEN, HENRY W. (*Yale Lab. Primate Biol.*) Studies of infant chimpanzees. *Science* 95(2459): 159-161. 1942.—The Yale Labs. are raising with special methods, from birth on, a population of chimpanzees, and expect thereby to eliminate certain technical disadvantages. The schedule of tests covers: Body wt., tooth eruption, 5 anthropometric measurements, coat and skin description, standardized photographic portraiture, radiographs, foot take, axillary temp., pulse, respiration, galvanic skin

tance, activity records, behavior tests (Gesell, modified), behavior records.—*E. W. C.*

19498. WOODBURY, ANGUS M. (*U. Utah.*) Man's biological future. *Science* 95(2457): 121-122. 1942.—The author continues a discussion (see Blackwelder in *Science*: 93: 359-366; Goodale, *Science* 93: 618; Miller, *Science* 94: 163-164;

L. O. Howard: "The Insect Menace"; Century Co.). Man will not lose the secular battle against the Insecta. His phyletic success and promise come from his quasi-monopoly on intelligence; he has overspread the world in the face of already-established other forms; he now is able to manipulate his own ecology.—*E. W. C.*

ANIMAL BEHAVIOR

(See also B. A. 16(6): Entries Homing instinct in salmon, 14238; Thyroid disturbances and maze ability, rat, 14511; Moonlight and tsetse activity, 15643; Territorial behavior in fish, 15667; Territorial restriction, Shrike, 15686; Predation in birds, 15691; (7): Behavior of hormonally-treated domestic fowl, 16101; Inanition as affecting mating response of ♂ rats, to testosterone, 16125; Role of cerebral cortex (rat) in discrimination of rhythms, 16206; Metrazol as affecting learning ability, rat, 16253; Shock reactions, rat, 16271; Mn and sex drive in sows, 16485; Temp. and R. H. and activity of beetle (*Ptinus*), 17127; Solitary-gregarious phases in *Schistocerca* (locust), 17301; Courtship and mating, heron, 17314; Bird behavior, 17320; and in this issue Hypothalamus function, 20014, 20015; Disturbances after removal of frontal areas, cats, 20020; Retention under hypnotic doses of nembutal, 20107; Color responses of insects, 21211; Migratory butterflies, 21341; Butterfly aggregations, 21343; Schooling behavior in mackerel, 21357; Homing in crows, 21371; Adaptations for tree-trunk foraging in birds, 21385; Birds, 21394; Cormorant, 21396)

19499. CARPENTER, C. R. (*Pennsylvania State Coll.*) Sexual behavior of free ranging rhesus monkeys. I. Specimens, Procedures, and Behavioral Characteristics of Estrus. II. Periodicity of Estrus, Homosexual, Autoerotic and Non-conformist Behaviour. *Jour. Comp. Psychol.* 33(1): 113-162. 1 fig. 1942.—These 2 articles describe the sexual behavior of Rhesus monkeys living in free ranging groups on a small island off Puerto Rico. Systematic observation of several behavior traits was made during estrus. The record of these observations is given in a 9-page table. Much of this behavior is to be considered as an integral part of estrus and not merely indicative of estrus. Estrus periods were found to be highly discrete. The period of estrus was 28 days. The inter-estroidal interval for 5 ♀♀ averaged 19.4 days. The discussion on form of abnormal sex behavior includes several case studies.—*C. W. Brown.*

19500. DOUGLAS, J. W. B. Nervous and hormonal factors influencing sexual behaviour. *Bull. Animal Behavior [London]* 1(3): 5-10. 1941.—This paper reviews the evidence, as found in some 66 exptl. studies, that the sexual behavior of mammals "is governed by the integrated function of both nervous and hormonal factors."—*H. W. Nissen (in Psychol. Absts.).*

19501. DOUGLAS, J. W. B. Comparisons in studies of mammalian behaviour. *Bull. Animal Behavior [London]* 1(3): 23-29. 1941.—A review of selected studies leads to the conclusion that "in spite of the vast amt. of experimentation that has taken place, there is not yet any satisfactory basis for a comparison of the behavior of different species of mammals. This is especially the case where the so-called 'higher mental activities' are concerned. Here, lack of any satisfactory definition of such activity is combined with a diversity of individual methods."—*H. W. Nissen (in Psychol. Absts.).*

19502. LOESER, J. A. Animal behaviour. Impulse, intelligence, instinct. 178p. Macmillan Co.: New York, 1941. Pr. \$2.

19503. ROBERTS, D. Imitation and suggestion in animals. *Bull. Animal Behavior [London]* 1(3): 11-19. 1941.—The exptl. evidence for and against imitation in animals from ant to ape is reviewed, with emphasis on primate studies. Imitation is defined as "the reproduction of the activities of one demonstrating animal by another imitating

animal, the activities of the first animal being the immediate stimulus, and those of the second the direct response to that stimulus." The author concludes that "true imitation, as it is defined in this article, has only been proved to exist among birds, where it is based upon auditory cues." 56 references.—*H. W. Nissen (in Psychol. Absts.).*

19504. SOUTHERN, H. N. (*Univ. Mus., Oxford.*) Periodicity of refection in the wild rabbit. *Nature [London]* 149 (3785): 553-554. 1942.—Examination of 192 stomachs of rabbits, timed by an electric gate at their warren March 9-12, shows that the greatest number of fecal pellets ingested during the 24-hr. day is from 6 a. m. to 4 p. m.—*E. D. Crabb.*

19505. WARDEN, C. J., SHERMAN ROSS, and STEPHEN ZAMENHOF. (*Columbia U.*) The effect of artificial changes in the brain of maze-learning in the white rat. *Science* 95 (2468): 414-415. 1942.—The increase in the number of cortical cells induced by injections of the pituitary growth hormone was not effective in speeding up maze performance.—*E. J. Umberger.*

19506. WINSLOW, CHARLES NELSON, MARTIN OS-ROFF, and ARNOLD MEADOW. (*Brooklyn Coll.*) Configural conditioning in the cat with auditory patterns of stimuli. *Jour. Psychol.* 13(2): 273-282. 1942.—To determine whether configural conditioning can be established in animals, 4 cats were first conditioned to a primary configural stimulus, the musical chord C-major. After the establishment of this C-R, by the Dworkin Motor Alimentary Conditioning Method, the cats were tested with the components of the chord, namely *c*, *g*, and *e* as simple and paired stimuli. In the conditioning of the response to the chord, simultaneous conditioning to the part or parts had not occurred. Tests with other configured stimuli, the cords A-major, B-major, E-minor and G-major were given. No general transposition of the C-R to the primary configural stimulus (C-major) had occurred, but there was evidence that some transposition of the response to the G-major chord had occurred because this chord had a similar pattern quality to the primary, having contained 2 of the same components as the C-major chord. In control tests with intensity variations and pure tones, the same results were obtained.—*B. von Haller Gilmer.*

ECOLOGY

Editors

ORLANDO PARK, *General Animal Ecology*
G. D. FULLER, *General Plant Ecology*
CHANCEY JUDAY, *Hydrobiology (Oceanography, Limnology)*

FREDERICK A. DAVIDSON, *Ecology of Wildlife Management—Aquatic*
ROBERT G. STONE, *Bioclimatology, Biometeorology*

(Other entries in this issue: [GENERAL AND ANIMAL ECOLOGY]—Respiration in hibernation, 19728; Geograph. distr. of insect pests, 21169; Ecology of *Aedes vexans* larvae, 21210; Surface tension and survival of mosquito larvae, 21214; Tsetse fly, 21215; Paleoecology of Upper Pliocene, Kansas, 21236; Molluscs of coastal dunes, England, 21275; Spiders of Penna., 21312; Developing mosquitoes, 21327; Lepidoptera of Tortugas, 21339; Migratory butterflies, 21341; Butterfly aggregations, 21343; Air-bladder reduction in fishes of Gangetic Delta, 21353; Schooling behavior in mackerel, 21357; Fence lizards, 21363; Spotted owl, 21376; Adaptations for tree-trunk foraging in birds, 21385; Illinois mammals, 21411; Sea otter, 21412; Origin of N. Amer. mamm. fauna, 21421. [PLANT ECOLOGY]—Lichens of Sweden, 20838; Myrtaceae of Argentina, 20881; Antagonism in mixed stands of forage plants, 20901; Erosion control, 20935; Afforestation for drying-up swamps, Uganda, 21005; Spore-dispersal mechanisms in fungi, 21119; Eel-grass disease, 21121; Plant culture in sunlight under temp. control, 21167)

BIOCLIMATOLOGY, BIOMETEOROLOGY

(Other entries in this issue: Humidistat, 19474; Light penetration in water, 19533; Meteorology, limnology and fish fauna of L. Erie, 19537; Blood changes at high altitudes, 19702; Response of animals to hot environment, 19767, 19768, 19771, 19772, 19773, 19775; Skin temp. and cutaneous sensitivity, 19997; Temp. and course of infectious myxomatosis, rabbit, 20198; Freezing of feet in alcoholics, 20232; Climate and prenatal development, man, 20309; Sunlight and rickets in Oklahoma, 20381; Rainfall distr. and wheat yield, Colorado, 20918; Soils and climate, India, 20942; Microclimate in vineyards, 21194; Migration of ducks, Vancouver Island, 21384)

19507. AHLMANN, H. W., J. W. SANDSTROM, and A. ÅNGSTROM. *Den pågående klimatandringen. Ymer [Stockholm]* 59: 51-82. 1939.—A symposium of 3 papers on climatic variations, exposing views for which the authors are well known. Ahlmann discusses results of his recent studies of the economy of glaciers in Iceland and Spitzbergen; Sandstrom gives the evidence for his thesis that warm waters of the N. Atlantic drift control temps. in northern Europe; and Ångstrom elaborates his theory of climatic changes due to variations in intensity of the horizontal N-S circulation of the atmosphere. A long review in English is given by J. Leighly in the *Geog. Rev.*, Jan. 1939, p.163-5.—R. G. Stone.

19508. BEAN, LOUIS H. (U. S. Bur. Agric. Econ.) Crop yields and weather. *U. S. Dept. Agric. Misc. Publ.* 471. iii + 131p. 880 maps. 1942.—

This is primarily a source book of data of 3 categories: *i*) a set of maps for each year 1886-1940 and each month thereof showing the monthly percentages of normal precipitation by States and another set showing quarterly (seasonal) percentages likewise; *ii*) a series of tables giving precipitation departures and temp. departures from normal, monthly by States, for the years as far back as the States have sufficient data to 1939; and *iii*) a series of tables giving the crop yields per acre by states for yrs. 1866-1939 for each of the following crops: wheat, corn, oats, rye, flaxseed, barley, rice, potatoes, sweet potatoes, hay, tobacco, and cotton. This material, while largely available elsewhere in scattered sources, is here made very convenient for research students of crop and climate correlations. The brief introduction by Dr. Bean states the hope that others will use the data for discovery of useful correlations,

though he admits much more detailed data than this book provides may be needed. Then he proceeds to throw out a suggestion that crop forecasting might be possible from long-range weather trends if "certain patterns in weather and crop changes that tend to be repeated from one year to the next or from one decade to the next" could be explained (by meteorologists) outside the realm of chance.

Some examples of alleged repetitive "patterns" of this sort are pointed out from the tables. But it is difficult to follow the sense of the author's method of selecting these patterns, since they appear to be isolated cases where a given sequence was repeated only once again. It is easy to show how in such a large sample of data such apparent repetitions might often be due to chance. But no objective criteria of any kind are offered for the physical reality of these repetitions; moreover, purely statistical criteria for reality would call for many more repetitions than might be expected by chance. Notwithstanding these dubious suggestions, this publication will prove of great utility as a convenient source of "raw material" for crop-weather studies from many (though not all) points of view.—R. G. Stone.

19509. BRAAK, C. The climate of the Netherlands West Indies. *Koninklijke Nederland. Meteorol. Inst. Mededeel. en Verhandl.* 36. 1-120. 14 maps. 1942.—An official, thorough and standard treatise on the climate of Curacao, Aruba, Bonaire, Surinam, St. Eustatius, St. Martin, and Saba. While there are many incidental tables of data, the work is namely a discussion and interpretation. The original observations for these colonies were published separately by the Dutch government and hence only some averages are given here. Some rainfall maps of Surinam are included.—R. G. Stone.

19510. BRICARD, J. *Nature des nuages en relation avec dimensions des particules qui les constituent. Compt. Rend. Acad. Sci. [Paris]* 210(4): 148-150. 1940.—The mean, max. and min. radii of fog or cloud droplets from measures made on a French mountain top were respectively (in μ): Nimbostratus clouds—9.8, 11.4, and 8; stratocumulus—7.6, 9.9, and 0.1; cumulus—5.4, 6.9, and 4.1; stratus—4.2, 5.9, and 2.4. Fogs in process of dissipation or formation have smaller drops than stable fogs: 4.7μ - 4.1μ - 6.1μ resp.; this was found both in lowlands and on mts. In fogs above zero°C the drop size is independent of temp.; below zero drop size is generally $< 8\mu$, below -10°C , $< 5\mu$.—R. G. Stone.

ELEMENTARY ARITHMETIC

When you buy a newspaper, 3 cents seems such a trivial amount to spend—but let's see how it mounts up over a period of time. If you purchase six daily papers at 3 cents and a Sunday paper at 10 cents you will spend 28 cents a week—or \$14.56 a year. That's nearly three times the average cost of a year's subscription to a section of *Biological Abstracts*. Naturally you want to know what is going on in the world during these critical times. But how much more important it is to you to keep posted on your biological news—to know what is being done by others in your field.

In spite of the many difficulties resulting from the war, *Biological Abstracts* is still covering the world's biological literature promptly and completely—and it is published in six low priced sections to meet the requirements of individual biologists (see inside front cover).

19511. DILL, D. B. Fatigue studies among Mississippi sharecroppers. *Harvard Alumni Bull.* 42(4): 113-119. 1939.—Preliminary informal account of physiol. studies on whites and negroes to find the extent and nature of acclimatization from winter to summer in the 2 races.—R. G. Stone.

19512. DÜLL, B., und T. DÜLL. Meteoropathologische Anschauungen für 120 Jahren, aus einem Werk von Th. Forster. *Deutsch. med. Wochenschr.* 1939(36): 1435. 1939.—Calls attention to a remarkable book of an Englishman transl. into German in 1882, in which many facts and views on the influence of weather, climate, and geophysical phenomena, especially periodic ones, on healthy and sick men now just being scientifically considered were discovered or deduced in straightforward fashion from clinical observations of the time. Quotations are made from Forster's book.—R. G. Stone.

19513. GLAWION, H. Staub und Staubfälle in Arosa. *Beitr. z. Physik d. freien Atmosphäre* 25(1): 1-43. Illus. 1938.—A detailed analysis of dust counts by Scholtz-Aitken-Lüdeling nuclei counter, Zeiss Konimeter and Owens dust counter at Arosa in eastern Switzerland. The instruments are compared and dependence of dust counts on atmospheric conditions discussed. The dust and nuclei counts are low at Arosa due to high elevation and quiet weather. Dust is much less, in winter than summer, owing to the rocky type of landscape nearby, the greater frequency of dusty air masses from the subtropics in summer and the heating by the sun. The nuclei, however, are more abundant in winter than in summer due to the frequency of subsiding anticyclonic Arctic air in winter, which leads to stagnation and local accumulation. The dust is usually high when nuclei are low and vice versa. Fog and haze have much dust, few nuclei; likewise subtropical air masses. Mid-latitude air masses have low or moderate nuclei and dust, because of good vertical convection. Dust is high in arctic air in summer and in tropical air in winter. Sahara dust falls are most frequent in March-May and Oct. Comparison with counts at other stations are attempted but hampered by lack of similarity in the instruments used and effects of local situation.—R. G. Stone.

19514. GORCZYNSKI, W. Climatic types of California, according to the decimal scheme of world climates. *Bull. Amer. Meteorol. Soc.* 23(4): 161-165. Map. 1942.—The area designated as Type 5 (the so-called "best climate throughout the year") covers 3% of California and 6% of the state and peninsula combined; the coastal area having a mild winter (Type 5 or 6) totals 38% of the state. The arid lands of the Mohave and Colorado deserts total 31% and the arid lands within the state's boundaries exceed but little (31% with 26% for the arid group of climates) the % ratio covered by steppes and deserts throughout all continents. The classification given is based on values of temp., precipitation, cloudiness, and the "aridity factor." An example of the calculation of the "aridity factor" is given.—Frederick Sargent.

19515. LUNELUND, H. Zur Kenntnis der Sonnen- und Himmelsstrahlung in Helsingfors 1934-35. *Acta Soc. Sci. Fennicae Nova Ser. A. 3(3)*: 1-64. 1939.—A very thorough discussion of direct and total (sun and sky) radiation measures, with extensive tables and diagrams of mean, extreme, and % of possible values for each month, hour of day, growing seasons, daily and 10-day periods. The 1928-1935 data are compared for Helsinki and for Sodankylä in northern Finland. The relation of cloudiness to total radiation is found, and from it radiation can be estimated for other towns where only cloudiness data are available.—R. G. Stone.

19516. MARTINEZ ALVAREZ, A. Studies of the relationship between atmospheric phenomena and human physiology. *Puerto Rico Jour. Publ. Health and Trop. Med.* 9(2): 194-216. 1933.—At San Juan, as at all tropical stations, there is a very regular diurnal cycle of the barometric pressure, high at 10 am. and 10 pm. and low at 4 am. and 4 pm. From many counts on various persons there is a definite daily peripheral leukopenia at 4 am. and 4 pm. and the eosinophilic count rises at the same time. Likewise blood pressure is lower at the hrs. of highest pressure. There is further a seasonal variation in the same sense, following the seasonal pressure course (low in Apr. and Oct., high in Aug. and Feb.). These relations show up in special

and extreme form when hurricanes occur; and partial solar eclipses also have an even more marked effect, lowering blood pressure and total leucocytes, in one case even to the extent of more than compensating for the opposite effect of a hurricane which happened to be nearby at the same time. The patients were unaware of the existence of the hurricanes in many cases. (Personal comm. to rev. from the author.) The author points out individual deviations from the average behavior, and hints at the various factors that might influence the results in his cases, but wisely refrains from any dogmatic theorization.—R. G. Stone.

19517. MONGE, CARLOS. (U. San Marcos, Lima, Peru.) Life in the Andes and chronic mountain sickness. *Science* 95(2456): 79-84. 1942.

19518. PENMAN, H. L., and R. K. SCHOFIELD. (Rothamsted Exp. Sta., Harpenden, Herts.) Drainage and evaporation from fallow soil at Rothamsted. *Jour. Agric. Sci.* 31(1): 74-109. 9 fig. 1941.—There is made a mathematical study of the 20-, 40-, and 60-inch drain gauges at Rothamsted from 1870 to 1940, but more particularly the last 30 yrs. The automatic records show seasonal change, evaporation phenomena, rates of drainage, time of drainage and natural periods of drainage. Daily totals of drainage and evaporation are considered as well as the influence of small leaks in the 40- and 60-inch lysimeters. Winter seasonal and summer seasonal drainage and evaporation are compared and contrasted and the influence of water vapor pressure gradient in the air above the soil is considered as are many other considerations and features of the long and carefully kept records.—Henry Dorsey.

ANIMAL

19519. BROWN, MORDEN G. (Washington U., St. Louis.) An adaptation in *Ambystoma opacum* embryos to development on land. *Amer. Nat.* 76(763): 222-223. 1942.—Determinations of the density of prospective neural tissue of *Ambystoma opacum*, *A. maculatum*, *A. tigrinum* and *Rana palustris* indicate that in this tissue the number of osmotically active units per dry wt. is approx. 33% greater in *A. opacum* than in the spp. that lay their eggs in the water. This difference is considered to be a physical-chemical adaptation to development on land.—M. G. Brown.

19520. HAMILTON, W. J. Jr. (Cornell U.) Winter reduction of small mammal populations and its probable significance. *Amer. Nat.* 76(763): 216-218. 1 fig. 1942.—Studies of small mammals, at Ithaca, N. Y., indicate that there is a pronounced reduction of the population from late fall to the following spring. This reduction may amount to from 40 to 80% of the total population. The probable reason for this reduction is a distinct turnover of the population each winter, the adults of many spp. dying of senility or some other cause after they have passed through a single breeding season. Thus the majority of shrews, deer mice, jumping mice, red-backed mice and spp. of similar size die when they have attained an age of from 15 to 22 months. The evidence for this reasoning is presented.—W. J. Hamilton, Jr.

19521. LOOSANOFF, VICTOR L. (Fishery Biol. Lab., Milford, Conn.) Shell movements of the edible mussel, *Mytilus edulis* (L.) in relation to temperature. *Ecology* 23(2): 231-234. 1942.—The analysis of shell activities of *M. edulis*, subjected to temps. ranging from -1.0° to 24.9°C . showed that within this range there was no correlation between the duration of openness of shells and the temp. changes. Mussels remained open more than $\frac{2}{3}$ the total time even at temp. as low as -1°C . Auxiliary observations on ciliary activities of gills, on stomach content and on presence of crystalline style of mussels showed that these animals were active and feeding when the temp. of surrounding water was at, or near, 0°C . Evidently mussels do not undergo hibernation at low temps. Sudden sharp changes in temp. did not cause changes in activities of mussel's shells. There was no diurnal difference in the amt. of time mussels remained open. There was no definite optimum temp. determined at which the mussel's shells were open for the longest time.—V. L. Loosanoff.

PLANT

19522. GHOSH, A. K. Submerged forest in Calcutta. *Sci. and Culture* 6(11): 669. 1941.—Several upright tree

trunks, with parts of their basal roots still intact were recently excavated from a depth 30 ft. below the upper peat layer of Dhakuria Laks in Calcutta. They belong to *Heritiera fomes* Buch. These finds, plus earlier ones, indicate the subsidence of an extensive forest once existing in this area. The silting process must have taken 2000 years. Similar trees, called Sundri, grow in abundance in the Sundribans forests on the muddy flats of the Ganges Delta and in Burma. They grow from 2 to 10 ft. below the high water mark in mud, with their roots exposed to the air for several hrs. after each tide.—M. D. Rogick.

19523. MALONEY, SISTER M. MARIAN. (Catholic Coll., Guthrie, Okla.) *Revegetation of coal stripped land near Henryetta, Okla.* *Proc. Oklahoma Acad. Sci.* 22: 123-129, 3 fig. 1942.—40 yrs. ago an area of land of typical prairie formation was stripped of surface soil in order to mine coal. A steam shovel used in the work greatly mixed the soil, depositing deep subsoil materials on the surface. This shale contained a great quantity of iron sulfide, which upon being exposed to the action of air and rainfall produced a very acid soil. Vegetation now consists mainly of trees and shrubs which are more numerous near water sources, and a few herbs widely scattered over the area. *Ulmus americana* is dominant, *Platanus occidentalis* and *Populus deltoides* are subdominants, and *Diospyros virginiana* is very prolific in comparison with other spp. *Rhus glabra*, *R. copallina* var. *latifolia*, *Rubus villosa*, *Vitis aestivalis*, *V. cordifolia*, *Pseudera quinquefolia*, *Smilax rotundifolia* are listed in the order of their frequency, very common to common. Only a vegetation composed of plants having an extensive root system which are acid-tolerant and which grow with a minimum of N will reach a climax formation in this region. For the possible rehabilitation of this area, at least 4-5 tons of lime per acre will be required to change the present environment to a condition favorable for calciferous plants.—Sister M. M. Maloney.

19524. MARTIN, E. V., and F. E. CLEMENTS. *Adaptation and origin in the plant world. I. Factors and functions in coastal dunes.* *Carnegie Inst. Washington Publ.* 521. viii + 107 p. 5 pl., 32 fig. 1939.—The studies reported in this monograph were conducted at the transplant gardens on Pikes Peak and in a coastal garden at Santa Barbara, Calif., and a dune garden nearby. Instruments and transplants were maintained at both places throughout the growing seasons, and a large number of perennials have become permanently established to yield further results in adaptation. Results of the study are discussed relative to analyses of the climatic and soil factors of the dune habitat, measurements with sealed and free phytometers, transpiration rates of native species, the structural relations of leaves and root systems, and correlations, including the rôle of physical factors, growth and life forms, leaf structure and holard, stomatal frequency, significance of salt content, xerophytes of dune and desert, nature of xerophytes, and criteria of xerophytes.—Courtesy Exp. Sta. Rec.

19525. OOSTING, H. J. (Duke U.) *An ecological analysis of the plant communities of Piedmont, North Carolina.* *Amer. Midland Nat.* 28(1): 1-126. 1942.—Communities were analyzed qualitatively, quantitatively and successional. A minimum of 10 list-count quadrats was used in each of 5 strata (overstory, understory, transgressive-shrub, seedling, herb) in stands of a series of age-classes for every successional trend. Four characteristics are used throughout for evaluating the species: density, frequency, basal area and height classes. Primary and secondary communities are treated separately for uplands and lowlands. Secondary communities predominate because of abandonment of land. Upland old fields, after one year, are dominated by *Leptilon canadense* and *Digitaria sanguinalis*, after 2 yrs. by *Aster ericoides* and *Ambrosia artemisiifolia*, after 3 yrs. by *Andropogon virginicus*. Pine (*P. taeda*, *P. echinata*) follows and forms closed stands in 10-15 yrs. Hardwoods come in under pine which gives way to oak-hickory in 150-200 yrs. Well-drained lowland fields may follow the same trend but more often hardwoods (birch, sycamore, red gum, tulip poplar) follow herbs, in pure or mixed stands. The invariable second stage is red maple-elm-ash, succeeded eventually by post-climax oak-hickory with hard maple and beech. Burning or cutting results in mixed hardwood dominance leading to

oak-hickory. Primary succession on islands proceeds from willow-alder to birch-sycamore to elm-ash-red maple to postclimax. South-facing bluffs are xeric and support blackjack-post oak with several xerophytes associated. North-facing bluffs are favorable habitats supporting a great diversity of species including the rarest in the region. Climax is largely white, black, post, northern red, southern red and scarlet oaks and white and pignut hickories. Best sites are characterized by white oak predominance with black oak an associate. Slightly less favorable sites support more post oak with blackjack oak in association. Lowlands mature to postclimax with willow oak, swamp red oak and shagbark hickories most abundant and hard maple and beech in association. A preclimax forest of blackjack-post oak develops on exceptionally poor sites. Life form analysis following Raunkiaer indicates a hemicycophytic flora with a phanerophytic physiognomy. Individual spectra for major communities emphasize differences; for successional communities show trends in life form changes.—H. J. Oosting.

19526. OSBORN, BEN. (U. S. Soil Conserv. Serv., Glen Rose, Tex.) *Biotic type mapping of Oklahoma watersheds.* *Proc. Oklahoma Acad. Sci.* 22: 31-34. 1 fig. 1942.—Natural vegetation, or "biotic," types were mapped to a scale of 1 inch equals 1 mile on 10 watersheds in Oklahoma comprising 1,668,640 acres, and major types were recorded along 3,100 miles of highways in the state. The watersheds mapped are listed. Biotic types were recognized by the dominant plants of the vegetation climaxes, including both climatic and edaphic climaxes. A list of the biotic types and subtypes recorded is presented. A generalized map of the major biotic types of the state is also presented.—Ben Osborn.

19527. PATTON, R. T. *Ecological studies in Victoria. VI. Salt marsh.* *Proc. Roy. Soc. Victoria* 54(1): 131-144. 1942.—Salt marsh is well developed along parts of the coast of Victoria. The floral composition possesses a cosmopolitan character, the genera and in some cases species, being those found in marshes in other parts of the world. This is in striking contrast to the coast dunes whose flora is distinctly Australian. The majority of the species are succulents, but that succulence is not a prerequisite for existence in a salt marsh is shown by the fact that the grasses present possess normal characters. The salt content of the soil was taken in summer and winter from the landward margin to the edge of the mangrove. The highest content exists near the landward margin, where there are frequently areas devoid of plants. The Cl content was expressed as grams of NaCl per 100 g. of dry soil and 100 g. of soil moisture. The highest value obtained for dry soil was 24.9 g. of salt per 100 g. The highest osmotic pressure obtained was 132.2 atmos. This was a bare area. Generally the osmotic pressure of the soil is < 50 atmos. and the O.P. of plant saps is also generally below this amt. Of striking interest is *Mesembrianthemum australe* whose O.P. in summer is well below that of the soil. Probably this plant physiologically differs from the others in its water relations. It has a water content of 1200% calculated on dry wt. Expts. on evaporation from extracted plant saps and a molar salt soln. showed that this was about 20 times as great as from an equivalent area of leaf surface. The cuticle is very thin and this cannot afford much protection against water loss.—R. T. Patton.

LIMNOLOGY

(See also Entry 19537)

19528. CHANDLER, DAVID C. (Ohio State U.) *Limnological studies of western Lake Erie. III. Phytoplankton and physical-chemical data from November, 1939, to November, 1940.* *Ohio Jour. Sci.* 42(1): 24-44. 1942.—General physical-chemical factors, exclusive of turbidity and ice-cover, were quite similar during 1939 and 1940. The ice-cover was thicker and more extensive in 1940 than in 1939. Turbidity in 1940 varied from 5 to 60 ppm. and was highest during summer and fall. The differences in time of occurrence, duration, and size of phytoplankton pulses of the 2 yrs. appear to be related to differences in turbidities. Seasonal abundance of 47 phytoplankters, consisting of diatoms, blue-greens and greens, is discussed. The spring phytoplankton pulse of 1940 occurred from March 14 to

May 28, and diatoms composed 98%. The fall pulse was unusually small and occurred in 2 parts separated by 3 weeks. Diatoms composed 77% of this pulse, greens and blue-greens together composed 23%. In 1939 the fall pulse was composed of 48% diatoms, 39% blue-greens, and 12% greens. Observations suggest that when the average turbidity is 25 ppm. or greater preceding and during a phytoplankton pulse, the pulse is small and brief. Likewise, when the average turbidity is less than 20 ppm. preceding and during a pulse, the pulse is large and of long duration. Diatoms compose a greater % of the total phytoplankton when the average turbidity exceeds 25 ppm. than when it is < 20 ppm. Conversely, green and blue-green algae compose a greater percentage of the total phytoplankton when turbidity is < 20 ppm. than when it is > 25 ppm.—*D. C. Chandler.*

19529. GEIJSKES, D. C. (*Agric. Exp. Sta., Paramaribo, Surinam.*) Observations on temperature in a tropical river. *Ecology* 23(1): 106-110. Map. 1942.—The temp. of the water in the Marowijne R. (Surinam), as observed at 13 sta. from its sources to the vicinity of the outlet in the ocean during July and Aug. 1939, is discussed. The measurements show a gradual rise of the river temp. from the source of the lower river, beginning with 22°C and rising to a max. of 31°C in the lower part of the river. The amplitude of the river water is small (max. 24°C), that of the air large (max. 9°C), a phenomenon resulting from the greater specific heat of water. The rise of the temp. in the river water is explained by a warming action from its surroundings which takes place by a direct and an indirect insolation. The direct way is caused by absorption from the sun's radiation; the indirect heating by warming from the bottom, especially from the granite rocks in the rapids and falls, and for a smaller part from the air. The rise of the temp. is limited, especially at night, by the air, which is the only cooling factor in the environment. The 2 processes of heating the river water are best illustrated in the daily variation of the river temp. Absorption from the sun's radiation shows a maximum in the "peak-hours" of the day, while bottom heating gives a max. at the end of the day. The creeks have a constant low water-temp., corresponding to that of the soil through which they flow. This constancy of temp. is caused by the over-roofing of the bush which protects the water from direct insolation. The smaller springlets, although running in the shadow of the forest, show a distinct daily variation with a top at midday, which is probably caused by the admission of sunlight at its max. altitude through the forest roof and by the quick warming of the small amts. of water.—*Auth. summ.*

19530. MEDBERY, H. C. (*San Francisco Water Dept.*) Limnological observations in San Francisco reservoirs. *Jour. Amer. Water Works Assoc.* 34(5): 719-735. 8 fig. 1942.—Study of physical, chemical, and biol. changes in San Francisco reservoirs shows that the main factors influencing thermal stratification are the depth of water, air temp., radiant energy, and wind velocity. Dissolved O₂ conc. is governed principally by plankton growths, bacterial action, and vertical circulation. Changes of pH are indicative of the production or consumption of CO₂. Reservoirs studied fall into Whipple's classification as "Tropical Lakes" showing one circulation season a year and can be expected to stratify at depths varying from 20-60 ft. depending on weather conditions and total depth. Each reservoir has its own stratification characteristics which are practically the same from year to year. Knowledge of the quality of reservoirs from top to bottom and the changes which take place throughout the year assists in choosing water of the best quality. Outlet structures should always be designed so that water may be drawn from several water levels.—*D. W. Graham.*

19531. OSORIO TAFALL, B. F. (*Esc. Nac. Cien. Biol. México.*) Materiales para el estudio del microplancton del Lago de Patzcuaro (Méjico). I.—Generalidades y fitoplancton. *An. Escuela Nacion. Cien. Biol. México* 2(2/3): 331-383. 113 fig. 1940.—This first part of a study of the microplankton of the Patzcuaro Lake (in the State of Michoacan, 2035 m. above sea level) deals with the phytoplankton and its ecological relations and is based on an examination and analysis of all the observations made by

the Limnological Station at Patzcuaro on the morphometric, physical and chemical conditions of the lake and on a study of numerous plankton samples collected, at least once a week, during 2 yrs. The level of the lake is gradually sinking, because the atmospheric precipitations do not compensate for the intensive evaporation. The lack of a thermocline, the temp. falling slowly from surface to bottom, is another important physical feature of the lake which is of the tropical type. The survey examines the horizontal and vertical distribution of the plankton, shows the observed irregularities in the behavior of its components and expresses the quantitative relations which appear to exist between plant and animal organisms of the limno-plankton, whose daily and seasonal variations are also discussed. The author lists all the phytoplanktonic spp. reported, classified as follows: 9 Myxophyceae, 1 Heterocontae, 1 Chrysophyceae, 19 Bacillariaceae, 19 Chlorophyceae, 8 Dinophyceae and 8 Euglenophyceae, in total 65 phytoplankters. Data are presented of the morphology and ecology of every spp. enumerated, figuring all the forms on 5 plates.—*Auth. summ.*

19532. PAX, FERDINAND. Beobachtungen über die Tierwelt in den Schwefelthermen von Split. *Prestampana iz Godisnjaka Oceanogr. Inst.* 2: 1-11. 1939-40.—In Badquelle the temp. was 22.4°C, pH 7.8, total solids 35.4 gms./kg., chiefly NaCl, H₂S 69 mg./kg. and O₂ < 0.5 cc./l. The fauna consisted of protozoa, Turbellaria, 3 spp. of Nematoda, and a cladoceran. In Klosterquelle the temp. was 19.1°, pH 7.8, total solids 30.7 gms./kg., O₂ < 0.5 cc./l. The fauna consisted of infusoria, snails, harpacticoids and the amphipod *Pseudoniphargus africanus*.—*Chancey Juday.*

19533. WHITNEY, LESTER V. (*State Teachers Coll., Springfield, Mo.*) A general law of diminution of light intensity in natural waters and the percent of diffuse light at different depths. *Jour. Optical Soc. Amer.* 31(12): 714-722. 7 fig. 1941.—A study of the angular distribution of the intensity of light at various depths indicates an increase of scattered light in deeper water, and the tendency of the angular distribution pattern to become symmetrical around a vertical axis with the maximum intensity from the zenith. A general law of diminution of light intensity is derived. The total light intensity directed downward and the percent of diffuse light directed downward were calculated for several depths in 2 Wisconsin Lakes.—*S. H. Bartley.*

WILDLIFE MANAGEMENT—AQUATIC

(See also Entries 19521, 19571, 21286, 21352, 21354, 21357, 21412)

19534. DAVIDSON, F. A. Marine ecology of the Pacific salmon. *Proc. Sixth Pacific Sci. Congr.* 3: 263-264. 1939 (1940).

19535. DAVIDSON, F. A. Age growth, and seasonal time of migration of the Pacific salmon as an indication of environmental conditions in the sea. *Proc. Sixth Pacific Sci. Congr.* 3: 533. 1939 (1940).—The size of the pink salmon and the seasonal time of their spawning migration may be used as an indication of the environmental conditions in the ocean under which they matured.—*Author.*

19536. De BUEN, FERNANDO. (*U. Morelia, Mexico.*) Fases ontogénicas de la Acumara (Algansea lacustris Steind.) del Lago de Patzcuaro. *An. Inst. Biol. Univ. Nacion. [Mexico]* 12(1): 345-354. 7 fig. 1941.—Describes the egg of *A. lacustris*, of large size (4.2-6 mm.), smooth capsule, large perivitelline space and yolk, which during embryonic development enlarges and changes form; masses of millions of the eggs float in the bays of the Lake of Patzcuaro (Méjico). The newly emerged embryo of 7.3 mm. (which is found at the bottom), the larva, the immature forms and the adult are descr.—*F. de Buen (transl.).*

19537. DOAN, KENNETH H. Some meteorological and limnological conditions as factors in the abundance of certain fishes in Lake Erie. *Ecol. Monogr.* 12(3): 295-311. 10 fig. 1942.—By methods of correlation, a survey was made of some of the factors concerned in the abundance of certain fishes taken commercially in Lake Erie. Air and water temps. vary similarly at different stations, and decrease from west to east. Precipitation and turbidity are correlated positively. Increased proportions of zooplankters near the surface were associated with more turbid

water. A return of 2.2% was obtained from the tagging of 3,761 fishes of 22 spp. Higher av. temps. in April and May were followed by increased catches of warm-water fishes in that yr., and of the total Ohio catch 1 yr. later, but had no demonstrable effect on catches of *Perca flavescens*, *Stizostedion v. vitreum*, and *S. c. canadense* individually. High temps. in May and June resulted in heavier catches of *S. v. glaucum* 2 yrs. later. Increased turbidities in the spring were associated with lower total catches in Ohio in the same yr., had no direct effect on fishing for *P. flavescens*, but were followed by increased catches of *S. c. canadense* 3 yrs. later. Light catches of *S. v. vitreum* were made in yrs. of high precipitation in the spring. Total catches of *Leucichthys* and *S. v. glaucum* were negatively correlated. *Notropis a. atherinoides* constituted 82 and 27% of the food of *S. v. vitreum* and *S. c. canadense*, respectively. Variations in natural factors may be of greater importance as modifiers of fish abundance than changes in artificial manipulation of the stock by commercial fishing.—K. H. Doan.

19538. DYMOND, J. R. Pacific salmon in the Arctic Ocean. *Proc. Sixth Pacific Sci. Congr.* 3: 435. 1939(1940).—The dog salmon (*Oncorhynchus keta*) was reported from the Lena River in Siberia. The dog salmon and the pink salmon (*O. gorbuscha*) were reported from the Mackenzie River in Canada.—F. A. Davidson.

19539. HIGGINS, ELMER. Role of the Bureau of Fisheries in conservation. *Proc. Sixth Pacific Sci. Congr.* 3: 395-404. 1939(1940).

19540. KESTEVEN, G. L. The biology and cultivation of oysters in Australia. I. Some economic aspects. *Australia Counc. Sci. and Indust. Res. Pamph.* 105. 1-32. 8 fig. 1941.—Hermaphroditic Sydney Rock Oyster (no Latin name is given) may spawn the whole year round but chiefly in spring and autumn. Within 3 weeks from fertilization, which takes place outside the organism, development is completed and the larvae attach themselves to sticks, stone slabs or other collectors set on tidal flats. The rearing of spat to maturity involves replanting of young oysters and placing them in wire netting enclosures for protection against predatory fishes such as bream and toadies. Practical recommendations of various phases of cultivation including the prep'n. of collectors, protection against enemies and harvesting are given.—P. S. Galtsoff.

19541. LIN, S. Y. Fish culture in ponds in the new territories of Hong Kong. *Jour. Hong Kong Fish. Res. Sta.* 1(2): 161-193. 1 pl. 3 fig. 1940.

19542. MYERS, GEORGE S. The work and program of the Natural History Museum of Stanford University in fisheries and general ichthyology. *Proc. Sixth Pacific Sci. Congr.* 3: 413-415. 1939(1940).

19543. NELSON, T. F. (Fish and Wildlife Serv., Elephant Butte, N. Mex.) Fertilizing bass ponds. *Progr. Fish Culturist* 56. 28-29. 1941.—The advantages of fertilizing rearing and spawning ponds in connection with the propagation of warm water fishes by placing large quantities of fertilizer in the center of each pond, instead of around the shoreline or over large areas of the bottom, are outlined.—Daniel Merriman.

19544. O'DONNELL, D. JOHN. (Wisconsin Conserv. Dept.) A new method of combating fungus infections. *Progr. Fish Culturist* 56. 18-20. 1941.—Zinc-free malachite green, previously reported by Foster and Woodbury as being an effective fungicide for fish, has been used with success in the treatment of *Saprolegnia* on large quantities of 18 spp. of fish of varying size and under different conditions by the Wisc. Conserv. Dept. A dip treatment of 10-30 sec. in a 1 to 15,000 soln. was non-toxic and was efficient both as a fungicide and as an antiseptic which promoted healing.—Daniel Merriman.

19545. RUSSELL, E. S. The overfishing problem. viii+130p. Cambridge University Press: New York, 1942.—A discussion of problems related to over-fishing with many examples from Gt. Britain dealing with exploitation of fish stocks, depletion of older fishing grounds, age analysis of populations, mortality and growth rates and the regulations of sea fisheries. Reduction of fishing is recommended as well as changes in mesh regulations of nets.—G. W. Hunter, III.

19546. SCHEFFER, VICTOR B. ([Fish and Wildlife

Serv.] Seattle, Wash.) Sea birds eaten by Alaska cod. *Murrelet* 23(1): 17. 1942.—Remains of a cormorant (*Phalacrocorax* sp.), a paroquet auklet (*Cyclorhynchus psittacula*), crested auklets (*Aethia cristatella*), and pigeon guillemots (*Cephus columba*) from stomachs of *Gadus macrocephalus* in Alaskan waters.—J. W. Slipp.

19547. SCHNEBERGER, EDWARD. (Wisconsin Conserv. Dept.) Fishery research in Wisconsin. *Progr. Fish Culturist* 56. 14-17. 3 fig. 1941.—The organization and chief activities of the Biol. Division of the Wisc. Conserv. Commission are outlined. Particular attention is paid to the control of such fish diseases as Furunculosis and *Saprolegnia*, nutritional studies in trout hatcheries are discussed, and the field studies on ecological relationships as well as pollution problems are indicated.—Daniel Merriman.

19548. SCOFIELD, W. L. Fisheries research program of the California State Fisheries Laboratory. *Proc. Sixth Pacific Sci. Congr.* 3: 417-418. 1939(1940).

19549. SETTE, OSCAR E. The research program of the South Pacific investigations of the United States Bureau of Fisheries. *Proc. Sixth Pacific Sci. Congr.* 3: 409-411. 1939(1940).

19550. SURBER, EUGENE W. (U. S. Fish and Wildlife Serv.) Belly tags for bass. *Progr. Fish Culturist* 56. 21-22. 1 fig. 1941.—The results of an expt. in marking small-mouthed black bass fingerlings (4.3-6.8 inches long) by the insertion of red celluloid belly tags into their body cavities are outlined. Mortality, as judged by seining the small pond in which the fish were placed after tagging a month later, was < 30%. The limited number of returns from the 1240 remaining bass, which were released in the Shenandoah R. in Nov., 1939, have been discouraging.—Daniel Merriman.

19551. THOMPSON, HAROLD. The investigation of the fishery resources of the Australian Commonwealth. *Proc. Sixth Pacific Sci. Congr.* 3: 363-368. 1939(1940).

19552. THOMPSON, WILLIAM F. Program of the International Fisheries Commission. *Proc. Sixth Pacific Sci. Congr.* 3: 419-423. 1939(1940).

19553. VESTAL, ELDEN H. (California Div. Fish and Game, June Lake.) Reclamation with rotenone of Crystal Lake, Los Angeles County, California. *California Fish and Game* 28(3): 136-142. 4 fig. 1942.—Crystal Lake, a 9-acre lake in Los Angeles Co., Calif., infested with goldfish and chubs, was treated Nov. 5, 1941 with 470 lbs. of cube (*Lonchocarpus utilis*) powder containing 5% rotenone at a conc. by wt. of cube and water of 0.6 ppm. The treatment killed an estimated 150,000 chubs, 100,000 goldfish, and 48 trout. From January 14 (70 days later) to Mar. 24, 1942, the lake was restocked with 14,000 rainbow trout averaging 6 inches long; and during the first 2 weeks of the trout season, from May 1 to 15, 1,848, anglers caught 6,936 trout at an av. rate per angling hour of 0.95.—E. H. Vestal.

19554. VILLADOLID, DEOGRACIAS V. Philippine fisheries and problems of their conservation. *Proc. Sixth Pacific Sci. Congr.* 3: 369-389. 1939(1940).

19555. WARFEL, HERBERT E. (New Hampshire Fish and Game Dept., Concord.) Trout management in New Hampshire. *Progr. Fish Culturist* 56. 2-9. 6 fig. 1941.—A 3-phase trout-management program based on the findings of a biological survey is outlined, and the first of these phases—namely, the distribution and propagation of trout—is described. Special emphasis is given to the details of an efficiently planned distribution, and to the rôle of the hatchery in the light of the management policy based on the survey. The procedures outlined are not revolutionary, but embody the application of common-sense principles to an exptl. program whose key-note is "planned activity."—Daniel Merriman.

WILDLIFE MANAGEMENT—TERRESTRIAL

(See also Entries 20431, 20436, 20991, 21006, 21252, 21381, 21400, 21405, 21415)

19556. BAUMGARTNER, F. M., and J. C. HOWELL. (Oklahoma A. and M. Coll., Stillwater.) Notes on the numerical status and migration of the birds of the Lake Carl Blackwell Project in North Central Oklahoma. *Proc. Oklahoma Acad. Sci.* 22: 53-64. 1942.—The effect of land use upon bird populations was detd. by an analysis of the

numerical status and ecol. distribution of 203 spp. of birds during a 3-yr. period. Cessation of agriculture and grazing resulted in the decrease of a few spp. typically associated with farm homes. The creation of a large artificial lake produced aquatic habitats that were utilized by large numbers of water and shore birds. Dates on the season of occurrence and nesting records are included in the discussion of the numerical status of each species.—F. M. Baumgartner.

19557. BENNITT, RUDOLF. (*U. Missouri.*) *Fundamentals in conservation education.* *Proc. Missouri Acad. Sci.* 5(4): 65-70. 1940.—The author suggests a 3-point proposal for conservation education involving (1) a statement of basic principles whose application may lead to restoration and wise management of natural resources, (2) listing of the groups to be approached, and (3) development of educational methods.—H. R. Bolen.

19558. BRACKETT, L. E. (*Wisconsin Conserv. Dept.*) *Cooperative protection areas.* *Wisconsin Conserv. Bull.* 5 (1): 47-53. 1940.—Out of a definite need for forest protection in agric. districts has arisen a program of organizing farm regions into cooperative areas to work with the state forest protection groups in Wisconsin. Such an organization involves education of the farmer as to the income value of his woodlot and the damage, either direct or indirect, done to woods and farm by fire. Also a program of fire prevention for both accidental and controlled burning is being carried on. The entire program is confronted by many difficulties of prejudice and lack of cooperation but has made steady progress since its inception.—Herbert McCullough.

19559. BROMÉE, FOLKE. *Vedavverkningarna och vilt-skyddet.* [Wood cuttings and wild life.] *Skogen* 27(12): 213. 1940.—Game cover should be preserved in fuelwood cuttings and bushes left undisturbed.—H. I. Baldwin.

19560. DAVISON, VERNE E. *Shrubs for wildlife on farms in the Southeast.* *U. S. Dept. Agric. Leaflet* 200. 1-7. 10 fig. 1940.—Wildlife borders, partly of shrubs, partly of herbs, are useful in separating forest and field and in preventing encroachment of woodland upon cultivated ground. Their construction and management are described. The use of shrubs for borders of tree plantations and for hedges is discussed. Waste areas on the farm as marshes, steep slopes, rock outcrops, and banks of streams and ditches can well be left in, or planted to, shrubs. The recommendations are made not only in the interest of wildlife but also in that of orderly and productive farming.—Courtesy *Wildlife Rev.*

19561. EDMINSTER, F. C. *Wildlife management through soil conservation on farms in the Northeast.* *U. S. Dept. Agric. Farmers' Bull.* 1368. 1-52. 26 fig. 1941.—Some of the possible ways of checking erosion and increasing wildlife in the 12 Northeastern States are considered in this practical account.—Courtesy *Exp. Sta. Rec.*

19562. GOOD, HENRY G., and LLOYD G. WEBB. *Spring foods of the wild turkey in Alabama.* *Amer. Wildlife* 29(6): 288-290. 1940.—Report on analyses of the food of 116 birds. It was nearly 9/10 vegetable, of which the predominant item was oak products—acorns, leaves, and catkins. Other prominent foods were seeds of *Nyssa*, fruits, buds, and twigs of beech, berries of dogwood, and nuts and flowers of hickory. The animal food was chiefly insects. Competition between deer and turkeys is not severe but hogs should be removed from areas being developed for turkeys. Other management suggestions are made.—Courtesy *Wildlife Rev.*

19563. GORDON, SETH. *An analysis of methods used to collect game-kill statistics.* *Pennsylvania Game News* 11(8): 4-5, 22-23, 30-31. 3 fig. 1940.

19564. HAUGEN, ARNOLD O. (*Michigan Dept. Conserv., Swan Creek Wildlife Exp. Sta.*) *Life history studies of the cottontail rabbit in southwestern Michigan.* *Amer. Midland Nat.* 28(1): 204-244. 1942.—Data from part of a 2-yr. study of the life history and management of the cottontail. Most of the information was secured by live-trapping, ear-tagging and releasing the rabbits. Winter food on the upland areas consists mainly of bark and twigs of white oak, flowering dogwood, sassafras, black oak, and New Jersey tea in the order listed. By palpating the abdomen of live ear-marked rabbits, for uterine swellings, it was found that as many as 4 litters in a single season are reared in this vicinity by a single ♀, and they apparently breed im-

mediately after parturition. Average litter size was 5.4. Av. wt. of cottontails during the hunting season is 3 lbs. 3 oz. for ♀♀, 3 lbs. 2 oz. for the ♂♂, and the immature weighed about 2.5 lbs. The most important enemies of the cottontail in the region are weasels, stray dogs, feral cats, and hawks (red-tail, broad-wing, and marsh). Expts. on the vulnerability of cottontails in an artificial burrow have shown that they are capable of escaping or defending themselves in such quarters. An ecol. relationship between the population density of cottontails and the density of the prevailing ground cover of shrubs has been demonstrated; namely, that rabbits most frequently occupy areas with a generous amt. of low ground cover, and may avoid locations with a dense forest canopy and no ground cover.—A. O. Haugen.

19565. HAWKINS, ARTHUR S. *A wildlife history of Faville Grove, Wisconsin.* *Trans. Wisconsin Acad. Sci., Arts and Lett.* 32: 29-65. 1940.—A discussion of the changes that have taken place in the plant and animal populations at Faville Grove near Lake Mills, Jefferson Co., during the century 1838-1938.—*Chancey Juday.*

19566. HIGHBY, PAUL R. *A management program for Minnesota muskrats.* *Proc. Minnesota Acad. Sci.* 9: 30-34. 1941.—Only 3 state-wide open seasons for trapping muskrats were had in Minnesota from 1930 to 1940. Seasons that extended into April depleted the breeding stock. A season in Nov.-Dec. would permit the harvest of part of the winter losses expected to occur by freeze-out, food shortage, disease, migration, mink predation, and pelt damage. Reduction of populations before winter would improve conditions for the survivors. Evidence from state auction sales data indicated favorable market values of winter-caught muskrats. A system of protected muskrat breeding grounds was recommended.—P. R. Highby.

19567. HOPKINS, FRANK. (*Game Management Div., Wisconsin Conserv. Dept.*) *The wild turkey problem in Wisconsin.* *Wisconsin Conserv. Bull.* 5(12): 47, 48. 1940.—Destruction of its natural habitat and over-shooting have caused the disappearance of the wild turkey from Wisc. It has been difficult to restock this bird because the proper strains have not been available. After restocking, predators and game law violators have made establishment difficult.—Herbert McCullough.

19568. LILLY, JOHN H. (*U. Wisconsin.*) *Effect of poisoning upon pheasants.* *Wisconsin Conserv. Bull.* 5(7): 32-36. 1940.—Pheasants under observation show no pathological effect nor do they retain significant quantities of As in body tissues after eating poison bait or grasshoppers which had died from eating arsenical baits. There is no danger to these birds from the use of such insect bait nor to persons eating pheasants that have ingested quantities of arsenical bait either directly or indirectly.—Herbert McCullough.

19569. MIDDLETON, A. D. (*Bur. Animal Pop., Oxford.*) *Rabbit control.* *Agric. Jour. Min. Agric. [Gr. Brit.]* 48(2): 100-103. 1941.—Catching rabbits first by snaring and trapping is suggested for marketable meat, followed by dosing the burrows with powdered cyanide to exterminate those animals not caught.—J. H. Stuckey.

19570. PAULEY, SCOTT. (*Wisconsin Conserv. Dept.*) *Influence of fire on blueberry yield.* *Wisconsin Conserv. Bull.* 5(5): 21-24. 1940.—Controlled burning can be beneficial in the production of blueberries if subsequent weather conditions are favorable to the best development of the plant. Burning acts as a pruning agent on the shrubs and removes most competing vegetation but is only beneficial where a blueberry crop is the sole interest. Repeated burning may injure the roots of the blueberry and kill it.—Herbert McCullough.

19571. REICK, CLARA V. *Conserving on a national basis.* *Wisconsin Conserv. Bull.* 5(1): 45-47. 1940.—Results of a survey of conservation organizations in various states show quail, pheasants, and turkeys as the game birds most commonly propagated. Removal of rough fish is common in many states, while propagation in fisheries is an activity found in every state conservation program with Wisconsin leading all others in this respect. Other types of game are also propagated in various states.—Herbert McCullough.

19572. SCHLUMPF, CHARLES A. *Death along the highways.* *Wisconsin Conserv. Bull.* 5(3): 71. 1940.—A survey of animals killed by automobiles in Fon du Lac

county, Wisconsin, in 1939 shows a total of 405 rabbits, 108 muskrats, 58 pheasants, 53 squirrels, 17 skunks, 12 dogs, and 1 weasel.—*Herbert McCullough*.

19573. SCOTT, THOMAS G. Progress report of the Iowa Cooperative Wildlife Research Unit, October 1935 to October 1939. *Amer. Wildlife* 28(6): 271-281. 9 fig. 1939.—The fundamental objectives of the undertaking were: Development of practicable and efficient census techniques; study of the economic importance of the various forms of wildlife, especially as affected by population fluctuations and differences in environment; investigation of the limiting factors that tend to decrease or increase wildlife populations; and development and testing of techniques and practices. A summary is given of results with the ring-necked pheasant, bob-white, mourning dove, blue-winged teal, coot, cottontail, muskrat, red fox, 2 spp. of skunks, and raccoon. There are notes also on less advanced studies and a tabulation recording the names of projects and investigators and the periods of investigation.—*Courtesy Wildlife Rev.*

19574. SILKETT, ROSS J. (U. S. Dept. Agric.) Conservation education and the farmer. *Proc. Missouri Acad. Sci.* 5(4): 70-72. 1940.—A review of the activities of various State and Federal agencies concerned with conservation education of Missouri farmers.—*H. R. Bolen*.

19575. TANNER, JAMES T. Three years with the ivory-billed woodpecker, America's rarest bird. *Audubon Mag.* 43(1): 5-14. 4 pl. 1941.—The decline of the ivory-bill resulted chiefly from the destruction of essential habitat by logging operations with random shooting and collecting as accessory causes. The bird apparently persists in small numbers in 5 localities in Louisiana, Florida, and possibly S. Carolina. Notes are given on character of habitat, and on feeding, courting, and nesting habits. Suggestions are made as to how the species may be preserved.—*Courtesy Wildlife Rev.*

19576. WALKINSHAW, LAWRENCE H. Nesting of the field sparrow and survival of the young. *Bird-Banding* 10 (3): 107-114. Map; (4): 149-157. Photograph. 1939.—Observations near Battle Creek, Michigan, on some 130 nests are reported upon as to general nesting habits of the species, eggs, incubation, and the young, their survival, and weights. Av. number of eggs 3.39; sets were smaller in late than in early nests; incubation period, 11 days; that of fledgling, 13-14 days; young were produced in 49 out of 97 nests to the number of 145 from 165 hatched eggs. Banding experience is described.—*Courtesy Wildlife Rev.*

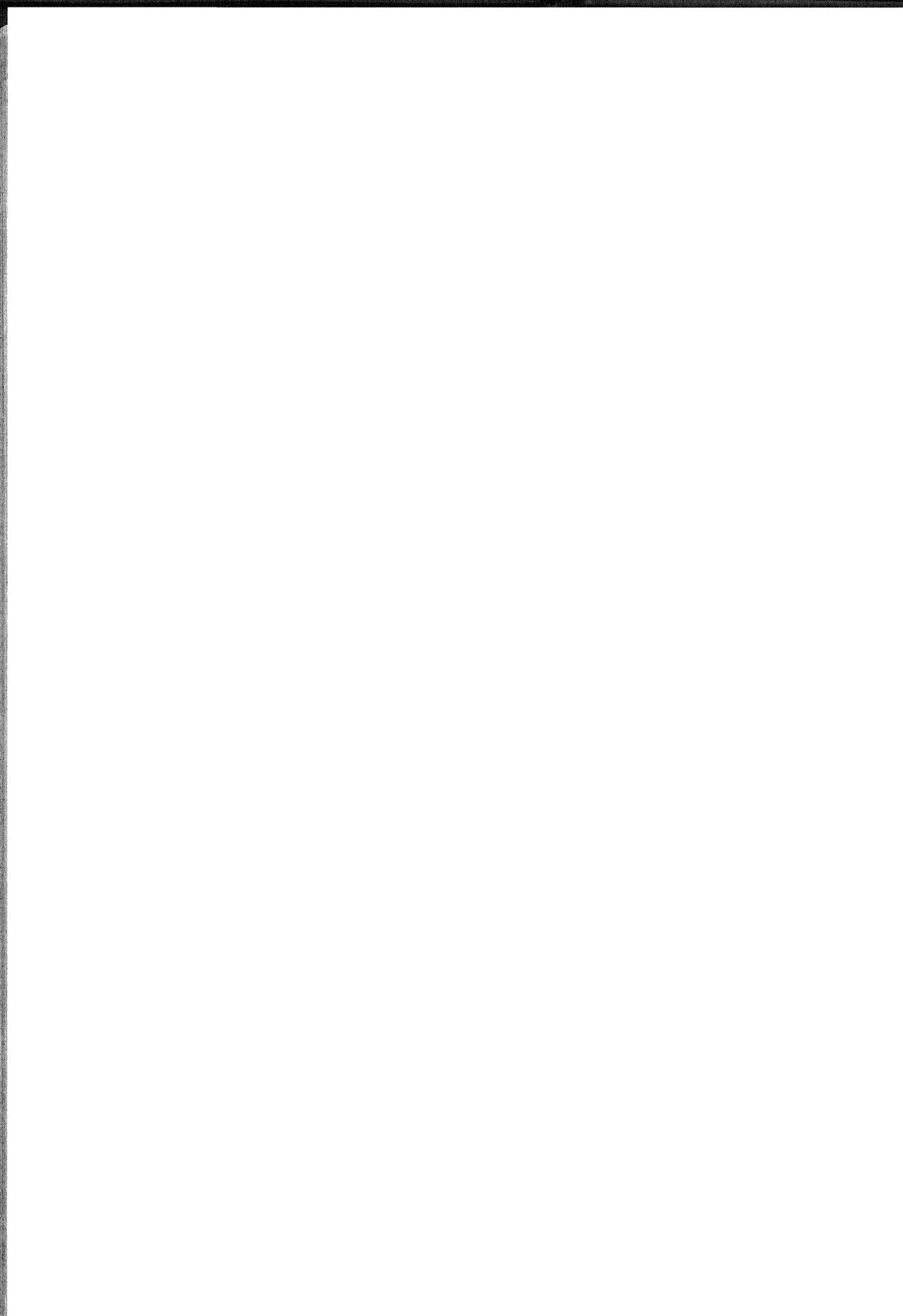
19577. WING, LEONARD. (State Coll. Washington,

Pullman.) Nutrition experiment with wild *Microtus* populations. *Jour. Wildlife Management* 6(2): 182-183. 1942.—The average wt. of mice, recovered from an area where food, including some of high nutritive value had been added, exceeded that of animals from a control plot.—*W. L. McAtee*.

19578. ANONYMOUS. Grouse crop investigation. *Wisconsin Conserv. Bull.* 5(3): 23-24. 1940.—Examinations of the crops of 309 specimens of grouse (10 prairie chicken or pinnated, 40 sharp-tailed, and 259 ruffed) during 1938 and 1939 show 86 different types of food used. The percentages of animal and vegetable matter eaten by these birds were as follows: in the prairie chicken 2.47% was of animal origin and 97.53% of vegetable; in the sharp-tailed grouse 9.57% was of animal origin and 90.41% of vegetable origin; and in ruffed grouse 29.37% was of animal origin and 70.63% of vegetable origin. The animals used for food were mostly insects, particularly grasshoppers; clover leaves, dandelion leaves and birch catkins were the most common type of plant foods.—*Herbert McCullough*.

19579. ANONYMOUS. The status of migratory game birds: 1940-41. *U. S. Dept. Interior Fish and Wildlife Leaflet* 196. 1-28. Map. 1941.—This subject is reported on each year by the Fish and Wildlife Service. Waterfowl: There were about 70,000,000 ducks and geese in N. America in Jan., 1941. Though about 5,000,000 more than the previous yr., this is the smallest increase since the beginning of the restoration program and is believed caused by liberalization of shooting regulations and increasing numbers of hunters. The green-winged teal and blue goose made the greatest percentage increases. Woodcock: Severe winter storm losses occurred in Jan., 1940. These have not been made up except locally, and there appears to be a general decrease in numbers. Wilson's snipe "has been decreasing steadily for many years." Coots continue to be too abundant. Rails have suffered not only from shooting, but from adverse weather. Mourning dove: Probably at its lowest ebb in history, particularly east of the Mississippi. Overshooting and winter storms are blamed. Western white-winged dove is at a record low, and a great reduction has been noted in the eastern subspecies. Band-tailed pigeon appears to be holding its own. "Apparently there must be renewed emphasis on conservation measures."—*R. M. Bond*.

19580. ANONYMOUS. Malayan wild-life. *Nature [London]* 149(3766): 17-18. 1942.—Speculations on the interference of war with wild-life are made and a number of incomplete references to a wide range of important works on animals and plants are given.—*E. D. Crabb*.



BIOLOGICAL ABSTRACTS

Editor-in-Chief, JOHN E. FLYNN; Assistant Editor, JEAN MACCREIGHT

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GENERAL BIOLOGY

Editors: A. H. GRAVES, *Plant*; C. A. KOFOID, *Animal*

(See also Entries 21459, 21476, 22424, 23414, 23428)

PHILOSOPHY OF BIOLOGY

21422. EGLER, FRANK E. (*New York State Coll. Forest.*) Vegetation as an object of study. *Philosophy of Science* 9(3): 245-260. 1942.—The biological concept of "organism" is a particular case of the general philosophical meaning of that term. In the latter sense there are many types of organisms within the plant field, and each type is assumed to be the product of emergent evolution. Types distinguished are individual organisms, plant communities, biotic communities, vegetation, and ecosystems. Vegetation is an emergent organism, and in close contact with other emergent organisms such as man, other animals, climate and soil. The place of vegetation science in the body of sciences and its subdivisions are discussed. Bibliography.—*L. J. Lafleur*.

21423. EMERSON, A. E. (*U. Chicago.*) Biological sociology. *Denison Univ. Jour. Sci. Lab.* 36(6/8): 146-155. 1941.—The biological principle of cooperation is illustrated by insect and human societies which exhibit analogous attributes to organisms and are thus designated as supraorganisms. Insect societies are integrated through the germ plasm while human societies are integrated through learned symbols, thus enabling human society to evolve with great rapidity. Although the social mechanisms are different, natural selection sorts out and preserves the more efficient systems, so that the functional aspects of the insect and human societies show many parallels. Natural selection operates upon various levels of integrated organic systems from cells and multicellular individuals to sex pairs, family units, societies and interspecific ecological communities. Cooperation between the parts of each system advances the ability of the whole unit to control and bring toward optimal condition the otherwise fluctuating factors. Natural selection is thus constantly favoring the more highly coordinated systems capable of passing on their adaptations to succeeding generations. The evolution of human social and ethical characteristics is governed by the same forces which have been directing organic evolution through the ages.—*A. E. Emerson*.

21424. GARNETT, A. CAMPBELL. Scientific method and the concept of emergence. *Jour. Philosophy* 39(18): 477-486. 1942.—The hypothesis of emergence is unscientific on the basis of Dewey's canons, because it hypothesizes an entity, the emergent, which is unverifiable in any domain. That this is so is demonstrated on the grounds that mind is not a quality among other qualities of the physical world, but is 1 of 2 distinct series of events, different in kind

from, though organically related to, the series of bodily changes.—*L. J. Lafleur*.

21425. HENLE, PAUL. The status of emergence. *Jour. Philosophy* 39(18): 486-493. 1942.—Novelty clearly exists in the universe, but this does not entail a doctrine of emergence. Emergence is apparently only a phenomenon of human knowledge: in any case the focus of discussions of emergence must be the concept of logical simplicity.—*L. J. Lafleur*.

21426. POLLOCK, THOMAS CLARK, et al. A theory of meaning analyzed: A critique of I. A. Richards' theory of language and literature, by THOMAS CLARK POLLOCK. (*New York U.*) Elementalism: the effect of an implicit postulate of identity on I. A. Richards' theory of poetic value, by JOHN GORDON SPAULDING. (*Stockton Jr. Coll.*) *General Semantics Monogr.* 3. xvi + 46p. 1942. Pr. \$1.50.

21427. WEISS, PAUL. Habits, instincts and reflexes. *Philosophy of Science* 9(3): 268-274. 1942.—The body is an organism which has developed from a simpler organism, composed of organs which have a quasi-independence of their own. But an organ is not independent: when we keep organs alive apart from the body it is a structurally similar organ but not the same as that which existed in the body. The development of the organism as a whole and of its organs consists largely of the development of habits: since all functions are gradually acquired through practice they may all be treated as habits.—*L. J. Lafleur*.

NATURE STUDY

21428. DEVOE, ALAN. *Lives around us*. 221p. Frontispiece, 21 fig. Creative Age Press, Inc.: New York, 1942. Pr. \$2.—This is a naturalist's account of some 20 forms of life ranging from trees through insects and

amphibia to mammals. Well written and attractively illustrated with woodcuts, the book is designed for the lay reader who has an interest in forms of life other than "our own wayward species . . . and its contemporary antics."—*Marjorie Gerken*.

21429. GUBERLET, MURIEL LEWIN. The seashore parade. [Illustrated by JAN OGDEN.] 197p. 6 col. pl., 59 fig. Jaques Cattell Press, Lancaster, 1942. Pr. \$1.75.—This is a popular account in non-technical language of the commoner types of invertebrates seen along American seashores, with notes on habitats and behavior. It forms an excellent guide for amateur naturalists of all ages interested in the life of the seashore.—*C. A. Kofoid*.

21430. HYLANDER, C. J. *Out of doors in summer*. 142p.

Frontispiece, 38 fig. Macmillan Co.: New York, 1942. Pr. \$1.50.—This book, intended for young people, discusses briefly some of the main plants and animals to be found out of doors in summer. Included are trees, wild flowers, reptiles, fungi, and some of the more common mammals.—*Marjorie Gerken.*

INSTITUTIONS, ADMINISTRATIONS

21431. ABBOT, CHARLES G. (*Smithsonian Inst.*) The Smithsonian Institution as an illustration of internationalism in science. *Science* 95(2478): 639-641. 1942.

21432. BITANCOURT, A. A. Trabalhos do Instituto Biológico em 1940 (Biología vegetal): [Accomplishments of the Instituto Biológico de São Paulo in 1940 (Plant biology).] *Biología [São Paulo]* 7(4): 85-92. 1941.—Expts. with *Atta sexdens*, coffee-tree, cotton, fruiting plants, plants in general, and miscellaneous subjects are mentioned and the literature published during the year is cited.—*J. C. M. Carvalho.*

21433. BRESSMAN, E. N. Projects in Inter-American agricultural cooperation. *Bull. Pan Amer. Union* 75(2): 63-74. Illus. 1942.—Includes an account of the history and some of the plans concerning the establishment of the Inter-American Tropical Institute and discusses investigations made in surveys of various agricultural products.—*Courtesy Chem. Abst.*

21434. CARNEGIE INSTITUTION OF WASHINGTON. Year Book No. 40, July 1, 1940-June 30, 1941. With administrative reports through December 12, 1941. *Carnegie Inst. Washington Yr. Book* 40. xxxii+346p. 1940-1941.—Annual report. Pp. i-xxxii deal with the acts of the Board of Trustees, and the Executive Committee, and include the financial statement for the yr. ending Oct. 31. Reports of the various departmental activities follow (p.3-334): of the Division of Plant Biology (Stanford Univ., California) by H. A. SPOEHR et al. (p.147-185); of the Department of Embryology (Baltimore, Md.) by GEORGE W. CORNER (p.187-209); of the Department of Genetics (Cold Spring Harbor, New York) by A. F. BLAKESLEE et al. (p.211-257); of the Nutrition Laboratory (Boston, Mass.) by THORNE M. CARPENTER (p.259-264); and of the following special projects in the biological sciences:—Revision of salivary-gland chromosome maps of *Drosophila melanogaster*, by PHILIP N. BRIDGES (Columbia U.); Research projects in the field of human heredity, by BARBARA S. BURKS (Columbia U.); Experimental studies of heredity in small mammals, by W. E. CASTLE (U. California, Berkeley); Investigations and preparation for publication of results of studies on Diatomaceae, by PAUL S. CONGER (U. S. Nat. Mus.); Studies on the genetic structure of natural populations, by TH. DOBZHANSKY (Columbia U.); Research on natural fluctuations in North American animal populations, by CHARLES ELTON (Oxford U.); Research in embryology, embryological pathology, and reproductive physiology, by ARTHUR T. HERTIG (Lying-in Hosp., Boston) and JOHN ROCK (Free Hosp. for Women, Brookline, Mass.); Studies on carbohydrate metabolism in diabetes at the New England Deaconess Hospital, by ELLIOTT P. JOSLIN (New England Deaconess Hosp., Boston); Chromosome studies on *Sciara*, by CHARLES W. METZ (U. Pennsylvania); Investigations on the constitution of the germinal material in relation to heredity, by T. H. MORGAN, JACK SCHULTZ, and VIOLA CURRY (California Inst. Tech.), and Research in influence of nutrition upon the chemical composition of the normal body, by H. C. SHERMAN (Columbia U.).

21435. CHAPMAN, FREDK. Scientific collections: their romance and tragedy. *Victorian Nat.* 58(10): 160-162. 1942.—Selected excerpts with comments, elucidations, addenda on repositories, from "Where is the . . . collection?" by Dr. Chas Davies Sherborn, Mch. 1940. Sherborn based the book on his card index on which he recorded pertinent facts of nat. hist. coll. known to him throughout the world, before and during his service as an accr. mem. of B. M. staff, 1880-1939. The excerpts, historically rich, reflect human interest, romantic or tragic, on the character and circumstances of the collectors.—*Olga Lakela.*

21436. INTERNATIONAL HEALTH DIVISION. The

Rockefeller Foundation International Health Division annual report. 1940. xii+247p. 8 pl. 1940.

21437. JARDINE, J. T., and H. L. KNIGHT. Report on the agricultural experiment stations, 1941. 128p. U. S. Dept. of Agric., Washington, 1942. Pr. \$15.

21438. LERCH, NEIL. (*St. Lawrence U., Canton, N. Y.*) St. Lawrence University. *Bios* 13(2): 88-90. 2 il. 1942.—Brief history (1856 to date) with names of some famous graduates. Geological and biological possibilities. Biological collections emphasize New York State material. "Insect collection is most extensive and the collection of birds . . . is complete for New York."—*L. J. Gier.*

21439. ANONYMOUS. W. K. Kellogg Foundation. The first eleven years, 1930-1941. xx+217p. Frontispiece, map, 217 fig. Trustees of the W. K. Kellogg Foundation: Battle Creek, 1942.

21440. ANONYMOUS. Scientific institutions in Latin America: Municipal Institute of Radiology and Physiotherapy. *Bol. Ofc. San. Panamer.* 20(2): 153-154. 3 fig. 1941.—A description of the research facilities at this Institute (in Buenos Aires).

21441. ANONYMOUS. Annual report of the Director to the Board of Trustees for the year 1940. *Field Mus. Nat. Hist. Publ. Rept. Ser.* 12(2) publ. 497: 179-330. Frontispiece, 9 pl. 1941.

TEXTS AND EDUCATION

21442. HEGNER, ROBERT W. (*Johns Hopkins U.*) College zoology. 5th ed. xvii+817p. 8 col. pl., 441 fig. Macmillan Co.: New York, 1942. Pr. \$3.75.—(For abstract of the 4th edition see B. A. 11(3): entry 5249.) Many changes have been made in this edition. Most of the chapters have been practically rewritten. The introductory chapter has been divided into 2, the 2d of which contains a more extended account of protoplasm and cells than in the 4th edition. Chapter XIII on Parasitism in Animals has been omitted, this subject being treated in the chapter on Ecology and Geographical Distribution. Although fundamental biol. subjects are studied in each large group of animals, it seemed desirable to present connected accounts of certain of these subjects with the addition of information not furnished in the descriptions of the types treated in relation to the various phyla. This has resulted in Chapters XXXI to XXXIV and XXXVI and XXXVII on Nutritive Processes in Animals, Skeletal Structures and Movement, Coordination and Behavior, Reproduction and Development, Ecology and Geographical Distribution and the Origin and History of Animal Life. Some of this information was contained in the 4th edition in Chapter XXXII entitled Some Zoological Principles and Theories. Throughout these chapters the human aspects of the subjects are emphasized. The glossary has been enlarged. A complete index is also provided. Many new black and white figures have been added, but the most noteworthy change in the illustrations is the inclusion of 8 colored plates by R. BRUCE HORSFALL, designed to emphasize that most animals in nature are colored and to elucidate various important phenomena involving colors and color patterns that cannot be illustrated in any other way.—*From auth. preface*

21443. HYLANDER, C. J. The world of plant life. 722p. Macmillan Co.: New York, 1939.

21444. KATZ, DAVID. "Scriptoscope" projects writing onto a screen. *Agric. News Letter* 10(3): 72. 1942.—"Scriptoscope" a class-room lecture desk enables the teacher lecturer to illustrate his discourses without turning his face from the audience. Sitting at his desk he draws his sketches or diagrams with a wax pencil on rolls of cellophane stretched across a 10-inch lens. Through a system of lenses and mirrors it is projected on the screen.—*M. F. Spaulding.*

21445. O'HANLON, M. ELLEN. Fundamentals of plant science. 488p. F. S. Crofts and Co.: New York, Pr. \$4.25.

21446. RIDDLE, OSCAR (editor), et al. The teaching of biology in secondary schools of the United States. A report of results from a questionnaire. 76p. Committee on the Teaching of Biology: 1942.—This questionnaire analysis reveals that a loss of 10% has occurred in instruction in biology in high schools in the last 10 years, especially in the larger cities, largely due to the substitution of social studies. About 20% of the subject, modified as hygiene, has been transferred to physical education. There is a

tendency to teach the subject not as a science but as a hobby or as a practical technology. Organic evolution is taught by only about 50% of the teachers, often in diluted form. There is need of a rally of all biological and administrative agencies to the support of adequately trained and fully supported teachers of biological science in the high schools of the U. S.—C. A. Kojoid.

21447. STILES, KARL A. (*Coe Coll., Cedar Rapids, Iowa*) Outline for teaching the scientific method. *Bios* 13(2): 78-87. 1942.—Plan of instruction for the scientific method in general zoology is presented in detailed outline with request for "comments, criticisms, and suggestions as to the improvement of the outline and its possible utilization."—L. J. Gier.

21448. WEIDNER, DOUGLASS ELLIOTT. (*Southwest Jr. High Sch., Reading, Pa.*) A general science workbook. 216p. Illus. Jaques Cattell Press: Lancaster, 1942. Pr. \$1.

21449. WEISS, PAUL. (*U. Chicago*) The training of biologists. *Science* 95(2454): 32-34. 1942.—A lecture.

MISCELLANEOUS

21450. ANSHEN, RUTH NANDA. (Editor.) *Science and man*, viii+494p. Harcourt, Brace and Co.: New York, 1942. Pr. \$4.—This is the 2d vol. of "The Science of Culture" series and includes 24 essays arranged in 5 groups. The essays cover physical anthropology and the evolution of man; the social sciences; the relation between the physiological being and the body politic; psychology and its relation to philosophy; religion, ethics, reason; the development of international law; the development and cultural effects of the mechanical sciences; discussion of facts and values in relation to social and natural sciences and a summary by the editor.

21451. McBRYDE, F. WEBSTER. (*Ohio State U.*) A map of the world in perspective. A new attempt to improve world areal plottings, based upon Eckert's No. 6 projection. *Ohio Jour. Sci.* 42(2): 63-64. Map. 1942.—In a new attempt to improve world areal plottings, Eckert's No. 6 projection is used as a base. It is equivalent to the sinusoidal and elliptical projections which it resembles but with much less distortion of shape, showing areas in their true size. The equal-area property is perhaps the primary requisite of any world map for general use. Another quality of extreme importance is the unbroken grid on which continental relationships are preserved. East-west directions are true, since parallels are straight, and in the central portion of the map good compromises are effected between rhumb-lines and great circle sailing routes. Scale is not greatly distorted along grid-lines from the equator to 40° latitude, and is close even when deviating from grid-lines, anywhere except along the extreme edges of the map. Scale is shown in terms of miles along 10° grid-intervals. Something of the spherical form of the earth is preserved by the shape of the grid, on which meridians are sine curves. From this it might be called semi-sinusoidal differing from the Sanson-Flamsteed in that meridians do not converge to points at the poles, but rather to lines almost $\frac{1}{2}$ the length of the equator; this avoids excessive marginal compression of areas. For the mid-meridian, 10° east longitude has been selected which makes it possible to show all the continents in their entirety. Off the grid, outlines of northern continents are repeated, poleward from the 35th parallels, in order to bring out relationships across the north Pacific ocean. Published in outline as "McBryde's Equal-Area Base-Map, College Book Company, Columbus, Ohio.—F. W. McBryde.

BIOGRAPHY, HISTORY, AND BIBLIOGRAPHY

Editors: CARROLL W. DODGE, EILEEN R. CUNNINGHAM, T. C. RUCH, JUDITH W. HUNT

(See also Entries 22136, 22766, 22918, 23190)

HISTORY

21452. COOK, S. F. (*U. California*) Francisco Xavier Balmis and the introduction of vaccination to Latin America. *Bull. History Med.* 11(5): 543-560. 1942.—On July 28, 1803 Francisco Xavier Balmis was appointed Director of the royal expedition to carry the newly discovered vaccination to the Spanish possessions in the Western Hemisphere. The personnel comprised 4 physicians, 2 surgeons, and 3 δ nurses. 22 boys, selected from various orphanages, served as human reservoirs for the vaccine fluid, and by means of chain vaccinations the serious problem of transport was solved. It is clear that vaccine was in the Caribbean colonies prior to the arrival of Balmis, but its origin is not known. Thanks to the character of Balmis, and his fortunes as well, the expedition was grandly conceived, well executed, and uniformly successful.—Sister M. E. Keenan.

21453. DEUTSCH, ALBERT. Historical inter-relationship between medicine and social welfare. *Bull. History Med.* 11(5): 485-502. 1942.—The Elizabethan poor law of 1601 became the basis for public relief in England and America for the next 3 centuries. Individual philanthropy characterized the 17th century, but in the 18th there was a trend toward association with a minimum of governmental interference. The Quakers were the ideal apostles of the rational humanitarianism of the period. During the early 19th century investigation and reform were the chief features in poor relief and public health. It was the work of individual crusaders that was outstanding in the middle of the century, while the end of the century witnessed the rise of a new profession—social work. In the tremendous upsurge of movements in the early 20th century, medicine and social welfare intermingled. Gradually they have encompassed the whole range of human living. The accent in both fields has shifted from amelioration and cure to prevention.—Sister M. E. Keenan.

21454. EDWARDS, LINDEN F. (*Ohio State U.*) Medical men as pioneers in non-medical fields. *Ohio State Med. Jour.* 38(5): 461-464. 1942.—This paper cites numerous instances of priority accredited to physicians for pur-

suits in non-medical fields, including belles-lettres, journalism, natural sciences, education, politics, exploration, inventions, business, art and architecture. The list of names includes many who gained distinction in both medical and non-medical fields, as, for example, Oliver Wendell Holmes and Silas Weir Mitchell, and many whose connection with the profession has been almost forgotten or has never been widely known, such as Fritz Kreisler, Georges Clemenceau, Christopher Wren, Francis Scott Key, William Henry Harrison, a number of first governors of the states, Richard Gatling, Joseph I. Guillotin, Alexander Graham Bell, David Livingstone et al.—L. F. Edwards.

21455. HEIDEL, WILLIAM ARTHUR. *Hippocratic medicine; its spirit and method*. xv+149p. Columbia University Press: New York, 1941. Pr. \$2.—Professor Heidel before his death was considering the preparation of a large study on Greek science. He chose Hippocratic medicine as a special field to illustrate the influence of Greek science and this volume is the result of his labors. After a brief introduction the author discusses in succeeding chapters, The Ideal of Science; The Science of the Time; The Medical Profession; Some Scientists of the Day; Scientific Methods; Medicine as an Art. Finally, Heidel concludes, "Whatever valuation one may place upon Hippocratic medicine, as a whole or in its various details, compared with the medicine of our day its true significance lies in the circumstance that it is the expression of an age of incomparable importance in the intellectual life of the race."—M. C. Leikind.

21456. HERRICK, C. JUDSON. (*U. Chicago*) The Young Naturalists' Society. *Sci. Month.* 54(3): 251-258. 1942.—A brief historical sketch of the Young Naturalists' Society which was organized in 1875 in Minneapolis.—F. R. Hunter.

21457. LEE, ELEANOR. (*Columbia U.*) History of the School of Nursing of the Presbyterian Hospital, New York, 1892-1942. xiv+286p. Frontispiece, 48 pl. G. P. Putnam's Sons: New York, 1942. Pr. \$3.50.—This is the history of one of the leading schools of nursing in a great medical center. It covers the first half century of the school, a period of

organization, formulation of standards, and of adjustments to rapid advances in medical knowledge and practice. Topics dealt with include the history of nursing, nursing during the Spanish-American War, the rise of Visiting Nursing and Social Service, nursing during the first World War, and the development of the Columbia-Presbyterian Medical Center. A chronological list of events from 1892 to 1942 concerning the latter institution fills 51 p. The book is a detailed history with emphasis on the persons involved in growth of this school of nursing.—C. A. Kojooid.

21458. NIELSEN, AAGE B. (Yale U.) A translation of Olof Rudbeck's "Nova Exercitatio Anatomica." *Bull. History Med.* 11(3): 304-339. 2 fig. 1942.—As Professor Göran Liljestrand points out in his biographical note, which precedes the translation, Rudbeck and Bartholin should both be called discoverers of the lymphatic system. Although Bartholin had priority of publication, Rudbeck's observations were made earlier. The *Exercitatio* (1654) comprises a dedicatory epistle, a preface and 10 chapters "demonstrating the aqueous efferent ducts of the liver and the serous vessels of the glands."—Sister M. E. Keenan.

21459. REICHENBACH, HANS. (U. California.) From Copernicus to Einstein. [Translated by RALPH B. WINN.] 123p. 11 fig. Philosophical Library, Inc.: New York, 1942. Pr. \$2.—The author reviews the development of modern ideas of space, time, and motion. The emphasis is upon method and the interrelation of expt. and theory. Chapter 1, The Copernican View of the World (18 p.), deals with the cosmological ideas of Ptolemy and the revisions wrought by Tycho Brahe, Kepler, Galileo, Copernicus, and Newton. Chapter 2, Ether (20 p.), treats light, touching upon the work of Roemer, Maxwell, Hertz, and Roentgen and the beliefs which lead to the notion of the ether. Chapter 3, The Special Theory of Relativity (24 p.), discusses the background of Einstein's contribution in the work of Michelson and Lorentz. Illustrations of the changes in common-sense views necessitated by the special theory are introduced. Chapter 4, The Relativity of Motion (12 p.), Treats the rôles of Newton, Mach, and Einstein in developing a comprehensive theory of gravitation and in solving the problem of the relativity of motion. Chap. 5, General Relativity (22 p.), discusses the astronomical tests of Einstein's theory and its significance in the world of ideas. "Thus, the theory of relativity represents the highest level on the road to an exact knowledge of nature, . . ." Chapter 6, Space and Time (17 p.), concludes the review with further instances of the conceptual changes brought about by relativity and the significance of these changes. There is no mathematics. The translation is in idiomatic English.—Herman Branson.

21460. ROSEN, GEORGE. The reception of William Beaumont's discovery in Europe. [With a foreword by JOHN F. FULTON.] 97p. Frontispiece, Schuman's: New York, 1942. Pr. \$5.—The material presented in this work includes an historical consideration of gastric physiology before 1833, a short biography of William Beaumont including the story of St. Martin's accident and how Beaumont took advantage of his unique opportunity to make his expts. and observations, how the latter were received particularly in Europe and the influence exerted by them. Rosen points out that several details of gastric physiology still to be found in modern textbooks were established by Beaumont, for example, that gastric digestion is the result of a chemical process, that gastric juice is not found in the stomach in the absence of food and that psychic and nervous influences, stimulants and unwholesome diet affect gastric secretions thus laying the foundation for practical dietetics and clinical studies on gastritis and nervous dyspepsia. The significance of his researches was first physiologically recognized in Germany, where they exerted a stimulatory influence on the investigations carried on by Theodore Schwann, Johannes Müller, Carl Ludwig et al in living human beings; the English were influenced somewhat later chiefly from the viewpoint of the clinical applications and the French latest, upon whom his work stimulated animal experimentation. Included in the latter was Claude Bernard whose writings contain numerous references to Beaumont's observations. Medical practitioners with the exception of the English, remained almost entirely uninfluenced by his observations. As Fulton comments in the Forward "this

fact in itself is not especially surprising since there were few physicians in the United States equipped to appreciate the full importance of Beaumont's use of scientific method; the medical profession, moreover, had not yet become accustomed to having important work emanate from the military services."—L. F. Edwards.

21461. SIGERIST, HENRY E. (Johns Hopkins U.) The sphere of life and death in early medieval manuscripts. *Bull. History Med.* 11(3): 292-303. 4 fig. 1942.—The Sphere of Life and Death, a device based on the magical virtue of numbers and astrology, was used chiefly to ascertain whether the patient would live or die. In this article 3 versions of the Sphere and some additional texts are given from 3 manuscripts not included in Lynn Thorndike's *A History of Magic and Experimental Science*.—Sister M. E. Keenan.

BIBLIOGRAPHY

21462. BECK, L. F. A second review of 16-millimeter films in psychology and allied sciences. *Psychol. Bull.* 39: 28-67. 1942.—This is a survey of those psychological films which have appeared since 1938 or were omitted from the first summary. The bibliography consists of specific information about 278 films. This includes the names of producer and distributor, title, length, date of production, cost, and characteristics of each film.—F. McKinney (in *Psychol. Absts.*).

21463. HUME, EDGAR ERSKINE. The golden jubilee of the Association of Military Surgeons of the United States—a history of its first half century, 1891-1941. 371p. Association of Military Surgeons: Washington, 1941. Pr. \$2.—This history, dealing with the first 50 yrs. of the work of the association, presents a complete, chronological account of the founding, the annual meetings, and the other events of importance in the affairs of the organization. Photographic cuts of all the presidents, editors, as well as facsimiles of documents and title pages of historical interest are included. The official journal of the association has been published under one title or another since the founding of the association in 1891. The present name, "The Military Surgeon," has been used since 1901. Colonel Edgar Erskine Hume, a distinguished officer of the Medical Corps of the Regular Army, the author of this history, is unusually well qualified to serve as a historian for the association.—R. C. Williams (in *Amer. Jour. Publ. Health*).

21464. LEECH, H. B. (Vernon, B. C.) The dates of publication of certain numbers of the Proceedings of the Entomological Society of British Columbia. *Proc. Ent. Soc. Brit. Columbia* 38. 29-36. 1941.—A chronological list of these publications with other data beginning with the first number published in March 1906 to Number 37 published Feb. 1941 is presented.—J. L. Williams.

21465. MOLTKE, OTTO. Af. Bibliotek for Laeger's indhold 1809-1940. [From the contents of Bibliotek for Laeger.] *Bibliotek for Laeger* 132(Dec.): 229-244. 1940.—One of the editors traces the progress of Danish medicine through articles in the journal, *Bibliotek for Laeger*, from its start during the Napoleonic wars up to 1940.—H. G. O. Holck.

21466. SIGERIST, HENRY E. (edited by.) Four treatises of Theophrastus von Hohenheim called Paracelsus. [Translated from the original German, with introductory essays by C. LILLIAN TEMKIN, GEORGE ROSEN, GREGORY ZILBOORG, and HENRY S. SIGERIST.] 256p. Johns Hopkins Press: Baltimore, 1941. Pr. \$3.—Dr. Temkin's translation of the "Sieben Defensiones" offers an excellent personal picture of Paracelsus and his ideas. Dr. George Rosen's translation of "Von der Bergsucht und andern Bergkrankheiten drei Bücher" is a significant interpretation of the first important treatise on occupational diseases. From his personal experiences, Paracelsus had direct acquaintance with miners' diseases and his observations constitute the origin of industrial medicine and hygiene. Paracelsus realized the importance of what we would now term "public health measures." Unfortunately he seemed to have had no practical suggestions for preventing the conditions he described so well. Another pioneering work of Paracelsus is his "Von den Krankheiten, so die Vernunft berauben," translated here by the historian of psychiatry, Dr. Gregory Zilboorg. This deals with

mental disorders and in many ways seems to anticipate modern views. Contrary to the then customary belief, Paracelsus approached mental disorder in a rationalistic manner, relatively free from demonism, and based on his own experiences. He also appreciated the significance of the unconscious and of sexual factors in mental disorders. Dr. Sigerist translates the poetic "Liber de nymphis, sylphis, pygmaeis et salamandris et de caeteris spiritibus." This is one of the most artistic and philosophical of the writings of Paracelsus, but also one of the most difficult to appraise. —From rev. by C. D. Leake (in Amer. Jour. Publ. Health.).

21467. SWAEN, A. E. H. "Voyage et Avantures de Francois Leguat et de ses Compagnons." *Ardea* 29(1): 19-44. 1940.—This book which ran through several editions in French, English, and Dutch from 1708-1721 was well regarded by early ornithologists and its illustrations were used as the basis for the description of at least one species, *Leguatia gigantea* Schleg. The writer was undoubtedly Maximilien Misson whose sources were accounts of travellers containing descriptions of animals and plants. The "voyage" is certainly largely if not wholly imaginary.—D. S. Farmer.

21468. [URDANG, GEORGE.] Forty centuries of pharmacy. English herbals. II. *Amer. Prof. Pharmacist* 8(7): 437. 1942.—Title page and a brief note on "A Nieuwe Herball . . ." by Henry Lyte (1578), a translation of Rembert Dodoens' "Cruydeboeck" (1554).—G. M. Hocking.

21469. [URDANG, GEORGE.] Forty centuries of pharmacy. English herbals. I. *Amer. Prof. Pharmacist* 8(6): 375. 1942.—Title page of and brief note on "The grete herball" of Peter Treveris (1526).—G. M. Hocking.

BIOGRAPHY

21470. McDONALD, ANGUS. Early American soil conservationists. *U. S. Dept. Agric. Misc. Publ.* 449. 1-63. Frontispiece, 8 fig. 1941.—A series of brief biographical sketches, emphasizing the contribution made by each individual to soil conservation. The biographies cover Jared Eliot (1685-1763), Samuel Deane (1733-1814), Solomon Drown (1753-1834), John Taylor (1753-1824), John Lorain (1764-1819), Isaac Hill (1789-1851), Nicolas Sorsby (fl. 1844-

1857), and Edmund Ruffin (1794-1865). Included are portraits of Eliot, Taylor, Hill and Ruffin.—Conway Zirkle.

21471. PENNELL, FRANCIS W. Botanical collectors of the Philadelphia local area. *Bartonia* 21: 38-57. 1942.—An historical account of the botanists within the Philadelphia Local Area (southern New Jersey, southeastern Pennsylvania, and adjacent Delaware and Maryland). It considers collectors from John Bartram (1699-1777) on, giving especial attention to those of the "classical period" of Philadelphia botany, Muhlenberg, B. S. and W. P. C. Barton, Pursh, Nuttall, Baldwin, Conrad, Schweinitz, Collins, and Rafinesque, a period that ended abruptly with Nuttall's return to England in 1841. This first part concludes with Oliver R. Willis (1815-1902), and a second part is to consider the collectors born since 1815.—F. W. Pennell.

21472. RODGERS, ANDREW DENNY, III. John Torrey: A story of North American botany. xi+352p. Map. Princeton University Press: Princeton, 1942. Pr. \$3.75.—Torrey (1796-1873), after practising medicine for a few years, became a prof. of chemistry, mineralogy, and botany, teaching in the U. S. Military Acad., in the College of Physicians and Surgeons of N. Y., and in Princeton U. He served also as Assayer to the U. S. Mint. Most of his time was devoted to the classification of plants, in which he became a recognized authority; his name is associated particularly with the spp. discovered during the exploration of N. America in the 19th century. Most of the present work is devoted to a summary account of the exploring expeditions, with extensive quotations from letters received and written by Torrey. It contains also biographical details of most of the well-known American botanists (and some foreign) of the period, with whom Torrey corresponded. The later chapters describe the formation of the U. S. Natl. Herbarium, the Natl. Acad. of Science, the Torrey Bot. Club, and the disposition of the Torrey herbarium; also Torrey's journeys to the West and South, made after his botanical work was done. The book concludes with a list of Torrey's works (largely lacking dates of publication), notes on sources, and a detailed index.—H. W. Rickett.

EVOLUTION

ALFRED EMERSON, *Editor*

(See also Entries Evolution of human and insect societies, 21423, of reptiles, 23384; Emergence concept, 21424, 21425; Induced chromosomal change, 21479; *Crepis*, 21483; Speciation in *Paniceae*, 21486, in *Drosophila*, 21546, in *Crataegus*, 21614, in bacteria, 22790, in *Saxifraga*, 22928, in *Populus*, 22931, in *Anopheles*, 23344, in legionary ants of U. S., 23357, in horned larks, 23387; Polyploidy and geogr. distr. of *Veronica*, 21491; Cytotaxonomy of boreal plants, 21492; Chromosome studies on genus formation in *Orthoptera*, 21503; Immunogenic studies of species in doves, 21534, 21540; *Peromyscus* and *Neotoma*, 21604; Origin and early evolution of paired fins and limbs, 22406; Cartilage and embryonic adaptation, 22433; Mutation in bacteria, 22528; Stability of ornamentation in *Pediastrium*, 22881; Floral morph. and evolution, 22917; Mutation in bacteria, 22528; Stability of ornamentation in *Pediastrium*, 22881; Floral morph. and evolution, 22917; Fertile generic hybrid in plants, 22936; *Anopheles* larvae and surface tension of water, 23235; Snails, 23324; Adaptations in mocking-birds, 23397; Migration of Cenozoic mammals, 23424; Evolutionary mechanisms in fossil mammals, 23433; *Equus*, 23437)

21473. CATTELL, J. [Ed.] Biological symposia. Vol. II. Speciation, defense mechanisms in plants and animals, biological basis of social problems, and regeneration. 280p. Jaques Cattell Press: Lancaster, 1941. Pr. \$2.50.—The volume contains 24 papers contributed to 4 symposia. 8 papers discuss speciation, 3 papers, defense mechanisms against foreign substances in plants and in vertebrates. 6 papers on the biological basis of social problems include a plea for the study of human nature as a natural science (W. E. RITTER), a parallel between physiological and social integration (C. M. CHILD), an argument for general interpretations of biological papers (F. B. SUMNER), a statement of the need for an ethics of enmity (S. J. HOLMES), and a discussion of religion as a factor in social evolution (E. B. COPELAND). 5 contributions on regeneration conclude the volume.—H. Peak (courtesy *Psychol. Abst.*).

21474. EVANS, ARTHUR T. (Miami U., Oxford, Ohio.) A new concept of origin and evolution. *Proc. Indiana Acad. Sci.* 51: 22-29. 1942.—The possibility that the earth may have first developed life in the vicinity of the poles is discussed. The poles may have cooled earlier than the equator due to the terrestrial heat lowering to the point where the

region was tropical while the torrid zone as known now was too hot for life due to the combined heat of the earth and the sun. The life first formed at the poles may have advanced equatorward, as further cooling took place, as a series of great ecological zones. Such cooling must still be taking place as the sun and the earth continue to cool. This would eventually result in vegetation of the temperate zone advancing to replace tropical vegetation which will be unable to exist longer due to a declining temp. Likewise more boreal plants and animals will replace those now temperate and finally plants able to withstand much greater desiccation will advance over all. Tundra will eventually replace our present flora. The earth will finally become dry and frigid. All forms of life in the beginning were probably perennial; rhythm was introduced and annuals born when declining terrestrial heat was dominated by the heat of the sun. This would seem true since annuals are so strictly limited to the temperate regions.—A. T. Evans.

21475. HERRERA, A. L. (Lab. Plasmogeny, Mexico, D. F.) Structures biologiques produites par le soufre des volcans et fumerolles. *Bull. Lab. et Soc. Internat. Plasmogenie* 2(26): 47-48. 8 fig. 1943.—The possible origin

life from volcanic emanations is considered. Volcanic sulfur, especially from Popocatepetl, was examined. Structures resembling protozoan and 1-celled algal species, very much like those already obtained in the laboratory, were discovered. Conclusions await determination of impurities in the sulfur and observations in other volcanoes and under other conditions.—A. L. Pickens.

21476. HOLMES, S. J. (U. California.) How life becomes complex. *Sci. Month.* 54(1): 57-65. 1942.—A few basic functions of living are discussed to illustrate the way in which life becomes complex. A function which has evolved as accessory to another function may itself be accessory to a 3d and may branch out on its own account and lead to a great variety of developments.—F. R. Hunter.

21477. STEBBINS, G. L. Jr. Apomixis in the Angiosperms. *Bot. Rev.* 7: 507-542. 1941.—A review of literature, principally that published since 1930. The processes of

apomixis, including adventitious embryony, apospory, parthenogenesis, etc., are defined and described. The application of the evidence from apomixis is to the problems of the mechanism of meiosis, the alternation of generations, and of distribution and evolution in apomictic groups is discussed. Evidence from apomixis is unfavorable to the precocity theory of Darlington, but is in agreement with the retardation theory of Sax and Sax. Apomixis does not provide critical evidence for or against the principal theories about the nature of the alternation of generations. In 43 genera of Angiosperms belonging principally to the fams. Compositae, Rosaceae, and Gramineae, there is direct or indirect evidence for the existence of an agamic complex. Such complexes, which contain both sexual spp. and apomicts, the latter largely of hybrid origin, present certain systematic and evolutionary problems, which are discussed.—G. L. Stebbins, Jr.

CYTOLOGY

Editors: R. E. CLELAND, *Plant*; C. E. McCLUNG, *Animal*

(See also Entries 21477, 21519, 21522, 21523, 21528, 21554, 21614, 22888, 22898, 22921, 22928, 22949, 23076, 23163, 23309)

GENERAL

21478. BAKER, JOHN R. (Univ. Museum, Oxford.) Chemical composition of mitochondria. *Nature [London]* 149(3787): 611-612. 1942.—About 4% of the material of mitochondria is lipines; the rest of the fatty material is true fat.—E. D. Crabb.

21479. BEAL, J. M. (U. Chicago.) Induced chromosomal changes and their significance in growth and development. *Amer. Nat.* 76(764): 239-252. 1942.—A review of the types of chromosomal changes induced by treatment with X-radiation, various temps., and chemical agents, with discussion of their significance in growth and development.—J. M. Beal.

21480. GUILLIERMOND, A. Données actuelles sur la signification physiologique des chondriosomes. *Bull. Histol. Appl. Physiol. et Path.* 18(4): 91-104. 1941.—This is a critical review of literature dealing with the functions of mitochondria.—J. G. Sinclair.

21481. GULICK, ADDISON. The chemistry of the chromosomes. *Bot. Rev.* 7: 433-457. 1941.—A review of the pertinent organic and inorganic analyses, physical investigations and discussions. A consideration of the significance and interpretation of the microchemical reactions. The nature and configuration of the proteins and nucleic acids are reviewed. Histological staining is interpreted in terms of the iso-electric points of the cell components.—Addison Gulick.

21482. TROMBETTA, VIVIAN V. The cytonuclear ratio. *Bot. Rev.* 8: 317-336. 1942.—A review of the literature (54 papers) of cell-nuclear size relationship in growth and maturity with brief mention of the physiol. implications, including a discussion of the importance of this ratio in division, senescence, rejuvenescence, physiol. changes and polyploidy.—V. V. Trombetta.

PLANT

21483. BABCOCK, E. B. Systematics, cytogenetics, and evolution in *Crepis*. *Bot. Rev.* 8(3): 139-190. 1942.—This monographic review (132 references) summarizes the papers, published mostly in the past decade, which have some bearing on the systematics of this genus, together with several papers on the cytology which at present have no obvious bearing on systematics.—Courtesy Exp. Sta. Rec.

21484. BEAL, J. M. (U. Chicago.) Chromosome fragments in *Lilium willmottiae* and hybrids between it and *L. davidi*. *Bot. Gaz.* 103(3): 617-619, 9 fig. 1942.—Preliminary report of the occurrence of a chromosome fragment in microsporocytes of *L. willmottiae* and its transmission to hybrids between *L. willmottiae* and *L. davidi*.—J. M. Beal.

21485. BRANDT, KNUT M. (U. Stockholm.) Physiologische Chemie und Cytologie der Presshefe (ein Sammelbericht und neue Untersuchungen im ultravioletten Licht und an gefärbtem Material). *Protoplasma* 36(1): 77-119, 19 fig. 1941.—A review of recent investigations together with some original work on the biochemistry and cytology

of *Saccharomyces cerevisiae* and related spp. is presented. Especial emphasis is placed upon the structure of the living cell under various physiological conditions, photographed with u.-v. illumination. Stained material and darkfield observation were used for comparisons. Under u.-v. the resting cells show strongly absorbing structures, the volutin granules, which consist of ribose nucleic acid. These are localized in the hyaloplasm, but become strewn about during fermentation. During rapid growth they are dissolved, but the hyaloplasm itself then assumes the property of strongly absorbing the ultraviolet. The vacuoles at most contain only small amts. of volutin. The metachromatic bodies are not identical with volutin, but may possibly consist of a sulfuric acid ester of a polysaccharide. Fatty and lipid substances are distributed in small inconspicuous drops. Glycogen is found under both aerobic and anaerobic conditions.—Adolph Hecht.

21486. BURTON, GLENN W. (Coastal Plain Exp. Sta., Tifton, Ga.) A cytological study of some species in the tribe Paniceae. *Amer. Jour. Bot.* 29(5): 355-359. 1942.—The somatic chromosome numbers in 27 races belonging to 26 spp. of Paniceae are presented. The 11 *Panicum* spp. examined proved to be regular members of a polyploid series having 9 as the basic number. Races of *P. anceps* and *P. texanum* were found that were higher* in the polyploid series than those previously reported, demonstrating the existence of intraspecific polyploidy in those species. Of the 8 *Paspalum* spp. studied, 5 occupied diploid, tetraploid, hexaploid and duodecaploid positions in a series having 10 as the basic number and extending to the hexadecaploid *P. floridanum*. The highly sterile *P. quadrifarium*, having only 30 somatic chromosomes, probably arose as a hybrid between diploid and tetraploid races or spp. *P. alatum* and *P. distichum*, 2 closely related spp. with 24 and 48 somatic chromosomes, respectively, demonstrate the existence of a new basic number of either 6 or 12 in *Paspalum*. Of the 9 *Pennisetum* spp. reported in the literature, 8 fit a polyploid series having 9 as the basic number. Numerous specimens of *P. glaucum* and *P. purpureum* possessed 14 and 28 chromosomes, respectively, indicating that 7 is also a basic number in this genus. Four introductions of the highly sterile perennial *Digitaria* spp. from S. Africa gave the irregular counts of 30, 34, 36 and 36 somatic chromosomes suggesting that some of them may be of recent hybrid origin. *Axonopus affinis* collected at Tifton, Ga., contained 80 somatic chromosomes.—G. W. Burton.

21487. EFTIMIU-HEIM, PANCA. Sur la structure du noyau quiescent dans la famille des Orchidées. *Compt. Rend. Acad. Sci. [Paris]* 212(25): 1096-1098. 1941.—Species of Diandreae and numerous tribes of Monandreae were studied as to their nuclear structure (fixation in Helly's, Nawaschin's, Laguesse's liquid, stained with Fe-hematoxylin or Feulgen's technique). Nearly all terrestrial orchids possess a nucleus with a more or less well developed network with or without chromocenters; however, *Goodyera*

(Neottiae) is an exception to this rule. On the contrary, all epiphytic orchids or lianas have nuclei whose chromatin reticulum is very thin or nearly absent. The respective importance of reticulum and chromocenters is extremely variable and all transitions exist between purely reticulated nuclei (*Listera* type) and almost exclusively chromocentric nuclei (*Cattleya* type). The author does not know any case of euchromocentric nuclei (prochromosomes) in orchids. —H. Simons.

21488. EYSTER, WILLIAM H. (Bucknell U., Lewisburg, Pa.) The production of polyploid *Tagetes*. *Proc. Pennsylvania Acad. Sci.* 15: 209-213. 1941.—Polyploids have been produced by means of colchicine and by means of crosses between *Tagetes erecta*, a diploid and *T. patula*, a tetraploid followed by treatment with colchicine. Up to 8n forms have been produced.—F. W. Emerson.

21489. HECHT, ADOLPH. (Indiana U.) Colchicine-induced tetraploidy in *Oenothera*. *Proc. Indiana Acad. Sci.* 51: 87-93. 8 fig. 1942.—The germinating seeds of 30 races and hybrids of *Oenothera* were treated in a 0.2 % soln. of colchicine; tetraploid plants were obtained for about 14 of these. The tetraploids differ from the diploids in general enlargement of all parts, and in several other characters peculiar to each of the species involved. Spreading calyx tips are characteristic of the tetraploids of *O. affinis*, as are serrate leaves for *O. rhombipetala*. Whereas pollen grains from diploid *Oenotheras* are 3-lobed many of the grains from the corresponding tetraploids are at least 4-lobed. If the diploid chromosome configuration is a circle of 4, that of the tetraploid tends to be a circle of 8, but not all cells form circles this large. The bivalents tend to become tetravalents, but some of the associations of 4 also fail. The characteristics and behavior of the induced tetraploids and that of the natural polyploid *Oenotheras* are compared.—Adolph Hecht.

21490. KUMAR, L. S. S., and A. ABRAHAM. (Coll. Agric., Poona, India.) Chromosome number in *Carica*. *Current Sci.* 11(2): 58. 2 fig. 1942.—*Carica* spp. are dioecious except *C. papaya*, in which different sex types were noted. Root tips of *C. papaya* showed 18 chromosomes in the somatic metaphase. Other species of *Carica* showed the same number, including *C. pubescens*, *C. candamarcensis*, *C. cauliflora*, *C. chrysopetala*, *C. peltata*, *C. pentagona*, and *C. quercifolia*.—R. A. Muttikowski.

21491. LEHMANN, ERNST. Polyploidie und geographische Verbreitung der Arten der Gattung *Veronica*. *Jahrb. wiss. Bot.* 89(3): 461-542. 13 fig. 1940.—A review and discussion.

21492. LÖVE, ÅSKELL, and DORIS LÖVE. Cyto-taxonomic studies on boreal plants. I. Some observations on Swedish and Icelandic plants. *K. Fysiograf. Sälskapsber. Lund Förfändl.* 12(6): 1-19. 1942.—In about $\frac{1}{3}$ of the spp. studied >1 chromosome number has been reported now and previously: in *Alisma plantago-aquatica* $2n=12$ (Sweden), 10, 12 (Germany), 14 (England); *Poa pratensis* $2n=70$, 78, 91 (Iceland), 50-114 (diff. countries); *Festuca ovina* (s. lat.) $2n=42$ (Iceland), 14, 28, 42, 56, 70 (diff. countries); *F. vivipara* $2n=21$ (Iceland), 21, 28, 35, 42 (Scandinavia, Scotland, Faeroes); *F. rubra* $2n=28$ (Iceland), 14, 42, 56, 70 (diff. countries); *Rhynchospora alba* $2n=42$ (Sweden), 26 (Germany); *Urtica urens* $2n=24$, 26, 52 (Sweden), 24 (Denmark, England); *U. dioeca* $2n=28$ (Sweden, Denmark), 52 (England); *Polygonum aviculare* $2n=40$ (Sweden, the form *heterophyllum*) and 60 (Sweden); *Potentilla anserina* $2n=28$, 42 (Scandinavia); *Erodium cicutarium* $2n=40$ (Sweden, England, Germany), 20 (England); *Impatiens parviflora* $2n=24$ (Sweden, Germany), 26 (Germany); *Glechoma hederacea* $2n=24$ (Sweden), 18 (Germany); *Stachys sylvatica* $2n=48$ (Sweden), 66 (Germany). The spp. with a single chromosome number are: *Sagittaria sagittifolia* $2n=22$; *Poa trivialis* $2n=14$; *Festuca pratensis* $2n=14$; *Maianthemum bifolium* $2n=42$; *Good- wera repens* $2n=30$; *Polygonum tomentosum* $2n=22$; *P. nodosum* $2n=44$; *P. hydropiper* $2n=20$; *Sedum telephium* s. str. $2n=48$; *Geum urbanum* $2n=42$; *Euphorbia helioscopia* $2n=ca. 32$; *Calitricha polymorpha* $2n=12$; *Bryonia dioeca* $2n=20$; *Lythrum salicaria* $2n=50$; *Falcaria vulgaris* $2n=22$; *Monotropa hypopitys* $2n=16$; *Myosotis palustris* $2n=64$; *Thymus serpyllum* $2n=24$; *Littorella uniflora* $2n=24$; *Eupatorium cannabinum* $2n=20$; *Erigeron acre* $2n=18$;

and *Lactuca muralis* $2n=18$. The spp. with >1 chromosome number are considered collective species, and some of them have also been treated as separate species by some previous taxonomists.—Åskell Löve.

21493. NEWCOMBE, H. B. (John Innes Hort. Inst., Merton, Eng.) The action of x-rays on the cell. I. The chromosome variable. *Jour. Genetics* 43(1/2): 145-171. 6 fig. 1942.—Pollen-grains of tulip, hyacinth, and *Tradescantia* x-rayed late in the nuclear cycle show at the pollen-grain division a slight increase in the number of new reunions and a considerable increase in the number of fractures of chromosomes. Fewer of the detectable breaks undergo restitution or new reunion. Reduced speed of reunion late in the nuclear cycle is suggested as the cause.—The time of chromosome splitting and its duration are independent of the length of time available (length of the nuclear cycle) in tulip, hyacinth, *Allium*, and *Tradescantia* pollen grains and *Tradescantia* pollen-tube divisions, over a range of 120-3840 hrs.—Exchange is found to be more likely to involve 2 parts of an arm than parts of opposite arms of the same chromosome, and more likely to involve the latter than arms of different chromosomes, in tulip, *Tradescantia* and *Drosophila*. Original proximity must influence which ends will reunite. In Y-bearing sperms of *Drosophila* reunion is more random. The proportion of asymmetrical exchanges (acentric rings with fragments, monocentric rings with fragments, dicentrics with fragments) to symmetrical exchanges (inversions, paracentric or pericentric, and translocations) is variable between spp. of *Tradescantia*. The variable factor is either the polarization of the chromosomes in the nucleus or the direction of reunion between polarized strands.—Killing of the pollen grains resulted only from loss of chromosome parts, and never from breakage or mutation alone, inasmuch as death followed only whenever a cell division intervened between treatment and detection.—H. B. Glass.

21494. PARTHASARATHY, N. (King's Coll., London.) Cytological studies in *Oryzeae* and *Phalarideae*. II. Further studies in *Oryza*. *Cytologia* 9(2/3): 307-318. 15 fig. 1938.—Both the Japanese and Indian vars. of rice were in 2 groups, one with 2 and the other with 4 nucleoli, corresponding to the number of SAT-chromosomes. The basic chromosome number was confirmed for *Oryza sativa* and determined for *O. coarctata*, $2n=48$.—Taylor Hinton.

21495. RAMANUJAM, S. (Imp. Agric. Res. Inst., New Delhi.) A haploid plant in *Toria* (*Brassica campestris* L.). *Proc. Indian Acad. Sci. Sect. B.* 14(1): 25-34. 2 pl., 10 fig. 1941.—The haploid is a reduced replica of the diploid with smaller leaves and flowers. The somatic chromosome number of the haploid is 10. At meiosis it shows 10 univalents from diakinesis to anaphase. Possible utilization of haploidy in practical breeding is discussed. 21 references.—W. C. Tobie.

21496. RANGASWAMY, K. (Annamalai U., Annamalai Nagar.) Cyto-morphological studies in *Asteracantha longifolia* Nees, (*Hydrophilia spinosa*, T. And.). *Proc. Indian Acad. Sci. Sect. B.* 14(2): 149-165. 52 fig. 1941.—The haploid and diploid numbers are 16 and 32 respectively. The floral parts develop in the order: calyx, androecium, corolla, and gynoecium. The anatomy of the stem, root, thorns and leaf are descr. The development of the micro- and megasporangia is traced. In the embryo development, suspensor and micropylar endosperm haustoria have been observed. The endosperm is cellular and the micropylar haustorium is binucleate. The morph. of the jaculator is descr. The position of the genus in the family is discussed. 43 references.—W. C. Tobie.

21497. SAEZ, FRANCISCO ALBERTO. (U. La Plata.) Alteraciones experimentales inducidas por la acción de la gravedad en las células somáticas de *Lathyrus odoratus* (Leguminosae). *An. Soc. Cient. Argentina* 132(4): 139-150 3 pl., 8 fig. 1941.—Germinating seeds of the sweet pea were centrifuged at 3000-6000 times gravity and the various cytological changes produced observed. All the components of the cell were observed stratified according to their respective densities. In certain cells the chromatic filament underwent, during prophase, dislocations and breaks. These are attributed to centrifugal action, aided by the low viscosity of the nucleoplasm in this stage of mitosis. A metaphase the chromosomes are displaced toward the

centrifugal pole, while the spindle remains in the centripetal position. During anaphase the achromatic figure appears as a rigid system, the spindle not being separated from the daughter nuclei. All the cells thus centrifuged are capable of recovery 18 hrs. after the last application. This permits the survival of some cells which have undergone chromosome changes and are capable of reorganizing a new karyotype that would induce the corresponding genotypic modifications. In the present case the harmony of the genetic system is broken by an external agent, centrifugal force, which interferes with the dynamics of cell-division, inducing an intergenic structural change which may produce mutations.—P. H. Yancey.

21498. SEIFRIZ, WILLIAM (Edited by). A symposium on the structure of protoplasm. A monograph of the American Society of Plant Physiologists. vi+283p. Illus. Iowa State College Press: Ames, 1942. Pr. \$3.—Following a short introduction by Seifriz, there are articles on the cell wall by C. W. HOCK, and on proteins and protoplasmic structure by L. S. MOYER. An article on the molecular structure in protoplasm by O. L. SPONSLER and J. D. BATH is concerned with molecular models of compounds found in living material. Then follows a posthumous article by H. FREUNDLICH, which has useful information on the mechanical properties of soils and gels with special reference to thixotropy and dilatancy. G. W. SCARTH contributes a short note on structural differentiation of cytoplasm, and this is followed by an article on the structural differentiation of the nucleus by C. L. HUSKINS. There are articles on protoplasmic streaming by D. A. MARSLAND and N. KAMIYAMA. The latter with its 46p. is one of the longest and one of the most valuable in the collection. There is also an article by W. H. LEWIS on viscosity changes in protoplasm in relation to ameboid locomotion and cell division. The book ends with a final word by SEIFRIZ on some physical properties of protoplasm and their bearing on structure, and there is a supplement with letters from K. H. MEYER and W. T. ASTBURY.—L. V. Heilbrunn.

21499. SMITH, STANLEY G. (McGill U.), and E. ROGER BOOTHROYD (Natn. Res. Coun. Canada). Polarization and progression in pairing. I. Interlocking of bivalents in *Trillium erectum* L. Canadian Jour. Res. Sect. C. Bot. Sci. 20(7): 358-388. 5 fig. 1942.—A total of 346 interlocks, occurring in 5 plants, were classified as to type of interlocking and type of bivalent concerned. Two main types of interlocking, true and false, occurred in equal numbers, the interlocking involving different bivalents and also the 2 arms of one bivalent. An interlocked chiasma, the first reported case in which the chromatids could be traced, and a clear example of chromatid interlocking were observed. No correlation was found between the frequency of interlocking and the temp. at which meiosis occurred. The ratio of the frequencies with which the individual bivalents were involved in interlocking is proportional to the relative lengths of the bivalent arms minus a minimum length. Interlocking of bivalents in the 10 possible combinations in pairs occurred with the frequencies expected from the frequencies with which the individual bivalents were involved. All loops of the bivalents were involved in interlocking, odd and even loops being involved in the ratio of 3:1. That adjacent to the centromere and the most distal loops were most frequently concerned and centric interlocking occurred with a frequency only $\frac{1}{3}$ that expected on a random basis. The loops involved were larger than corresponding loops free from interlocking. Interlocking was found to reduce the chiasma frequency. The chiasma frequency of encircled bivalents was higher than that of bivalents in cells devoid of interlocks, which, in turn, had a higher frequency than the encircling bivalents of false interlocks. The factor causing the reduction was found to reduce the chiasma frequency of non-interlocked bivalents accompanying interlocked bivalents. The reduction in chiasma frequency is insufficient to have resulted from loss of chiasmata. It is proportional to the increase in size of the interlocking loops, which is the result, not of increased repulsion, but of simple interference with the positions in which chiasmata are formed at pachytene. It is concluded that interlocking is a result of the derangement of chromosomes that are normally polarized and

have their proximal parts in an orderly spatial arrangement prior to pairing.—Auth. abst.

21500. THOMAS, P. T. (John Innes Hort. Inst., Merton, London.) A useful abnormality of the pollen in a pear. Nature [London] 149(3771): 168-169. 1942.—In the pollen of the var. Buerré Bedford, cell-walls fail to develop between the 4 haploid nuclei after meiosis. Thus, the pollen mother cells are directly transformed into giant pollen grains having 4 nuclei which, by fusion of the nuclei, form 5 types that germinate readily in culture. By using this pollen in crosses with existing vars. a wide range of new polyploid forms of pears may be synthesized.—E. D. Crabb.

21501. VILLARS, R. Contribution à l'étude cytologique de l'action des rayons X sur les cellules végétales. Compt. Rend. Soc. Biol. 131(21): 947-950. 1939.—In *Pinus pinea*, *Vicia faba*, *Lupinus albus*, *Helianthus uniflorus* and *Hyacinthus annuus*, atypical divisions become less and less frequent. About 3 hrs. after irradiation (50KV, intensity 30 mA, dose 450r/sec, without filter, anticathodic distance 12.5 cm) a resting phase commences, being more or less prolonged according to the species and dose.—H. Simons.

ANIMAL

21502. BUCK, JOHN B. (U. Rochester), and A. M. MELLAND (Cambridge U.). Methods of isolating, collecting and orienting salivary gland chromosomes for diffraction analysis. Jour. Heredity 33(5): 173-184. 3 fig. 1942.—Two methods for isolating salivary gland nuclei from unfixed glands and 3 methods for isolating nuclei and single chromosomes from fixed glands are described. Techniques for collecting these nuclei and chromosomes and mounting them in various ways for X-ray and electron diffraction photography are described. The photographs taken have not justified any definite conclusions regarding the structure of salivary gland chromosomes, but the technique has not been adequately tested. The methods may be of value in physiological and biochemical investigations, and in electron microscopy.—Auth. summ.

21503. CH'EN, SHIH-TI. (Nation. Med. Coll., Shanghai) Differential chromosomes of *Arcyptera coreana* shirakii (order Orthoptera). Jour. Morph. 71(1): 77-100. 3 pl. 1942.—*A. coreana*, a sp. belonging to the Acridinae, is very closely related to *Mecostethus*, which has been thoroughly studied by McClung. The chromosomes of these 2 genera, in several respects, are very much alike, viz., the slender and rod-shaped spermatogonial chromosomes; the almost uniformly, long, extended and approximately V-shaped structures of the tetrads at metaphase when viewed from the pole of the spindle; the structure and behavior of the accessory, the ring, the dimorphic, and the ditactic chromosomes. The most reasonable explanation of such resemblance is that of a process of a direct and continuous reproduction. However, somewhere in the phylogenetic history of the group, distinctions must have been set up which divide it into 2 separate genera. It is thought that the large rod chromosome present in *Arcyptera* may affect the relations to the cells as a whole and the effects thus produced may influence the developmental processes so that *Arcyptera* becomes a distinct genus from *Mecostethus*.—Auth. (courtesy Wistar Bibl. Serv.).

21504. CLARK, G. L., M. R. BARNES, and E. R. BAYLOR. (U. Illinois.) A study of lampbrush chromosomes by the electron microscope. Science 95(2462): 250. 1942.—When photographed with the electron microscope, some lampbrush chromosomes appeared to be highly branched and subbranched, and were fern-like in appearance. The threads were crystalline and single. Others showed less numerous, thicker, more globular side branches, and some showed no branches. No loops were seen.—E. J. Umberger.

21505. GRASSÉ, PIERRE P. Etude de mécanique cellulaire: centromères et centrosomes dans la mitose de certains Flagellés. Compt. Rend. Soc. Biol. 131(21): 1015-1018. 3 fig. 1939.—One of the essential features of the flagellates *Caduceia theobromae*, and the hypermastigines *Trichonympha agilis* and *Pseudotrichonympha intreflexibilis*, is that their chromosomes are attached to the nuclear membrane. Apart from centrodesmosis there are striking analogies between the *Lynidium* type of mitosis in Peridinea as defined by Chatton (1921, 1938) and that of *Caduceia* and *Oxymonas*.—H. Simons.

21506. HELWIG, EDWIN R. (U. Pennsylvania.) Unusual integrations of the chromatin in *Machaerocera* and other genera of the Acrididae (Orthoptera). *Jour. Morph.* 71(1): 1-29. 4 pl. 1942.—The spermatogonia of *M. mexicana* have 14 chromosomes, 7 atelomitic and 7 telomitic. The atelomitic elements are multiples which have unique characteristics but are fundamentally like other Orthopteran multiples. Only 21 diads can be accounted for instead of the 23 usually present in the sub-fam. to which this form belongs. Unusual integrations of the chromatin in other genera are considered and the relations of these aberrations to numerical and size differences and to the formation of multiples and atelomitic chromosomes are discussed. Comparisons of the types of chromatin changes that have occurred naturally during the course of evolution and that have become established in extant species are made with those produced by irradiation.—Auth. (courtesy Wistar Bibl. Serv.).

21507. HINDLE, E., and G. PONTECORVO. (U. Glasgow.) Mitotic divisions following meiosis in *Pediculus corporis* males. *Nature [London]* 149(3789): 668. 1942.—In the body louse the phase of multiplication of the germ cells which usually precedes meiosis takes place in part after meiosis.—E. D. Crabb.

21508. HUNT, THOMAS E. (U. Alabama.) Mitotic activity in the anterior hypophysis of female rats. *Anat. Rec.* 82(3): 263-276. 1942.—Mitotic activity was detd. in the ant. hypophysis of 19 immature and 67 mature ♀ rats in different phases of estrous cycle. In the immature animals mitotic activity declined from 85 to 99 mitoses per square mm. of section on the 1st day to 1-6 mitoses on the 50th. In mature animals the mitotic activity varies during the estrous cycle as follows: During diestrus and proestrus less than 2 mitoses per square mm. During the first 12-16 hr. period of estrus the number of mitoses gradually increases. The greatest activity was found in the latter part of estrus 18-30 hrs. after its onset. At this time as many as 72 mitoses per square mm. of section 3 micra in thickness were found. The activity declined during metestrus. The majority of mitoses occurred in the chromophobes and only 5-10% were found in acidophiles. No dividing basophiles were seen. Mitotic activity in the mature animals declined in general as the animals became older. The mitotic activity in the sexually mature rats is evidently greater than that necessary to account for the

growth of the gland and it serves to compensate for cells lost by degeneration.—Auth. (courtesy Wistar Bibl. Serv.).

21509. NOVIKOV, I. I. [Chromosome behaviour during spermatogenesis in camels *Camelus dromedarius* L. and *Camelus bactrianus* L. and their *F₁* hybrid.] [With Eng. summ.] *Trudy Instituta Genetiki (Bull. Inst. Genetics)* 13: 285-296. 3 fig. 1940.—No particular distinctions could be found in the form or number of chromosomes between dromedary and bactrian camels or hybrids between them. In all cases $n=35$ and there seems to be no reason for sterility.—Courtesy *Exp. Sta. Rec.*

21510. PHILIP, URSULA. (U. Coll., London.) Meiosis in *Drosophila*. *Nature [London]* 149(3784): 527-528. 1942.—In aceto-orcein smears, testes of 2-day-old Oregon line of *D. subobscura* exhibited all stages of spermatogenesis. Meiosis in the testes begins in the fully grown larva and continues in waves throughout the whole of pupal and adult life, at least up to a fortnight after eclosion.—E. D. Crabb.

21511. SMITH, STANLEY G. (McGill U., Montreal.) Polarization and progression in pairing. II. Premeiotic orientation and the initiation of pairing. *Canadian Jour. Res. Sect. D. Zool. Sci.* 20(8): 221-229. 1942.—Homologous chromosomes in the Diptera associate side by side in pairs at each and every anaphase (somatic pairing) and reappear in the following prophases relationally coiled. In plants and animals other than Diptera the homologues at anaphase (with 1 exception) show no such specific attraction: at prophase the relational coiling of homologues is here supplanted by a relational coiling of sister chromatids. The 1 exception arises at the anaphase of the last premeiotic division—homologues become associated in pairs and reappear in the following prophase relationally coiled. In the Diptera the chromosomes are single at each and every anaphase: in other animals and plants the chromosomes are double at all anaphases except that of the last premeiotic division. Hence at this latter division the attraction in pairs between chromatids is replaced by an attraction between pairs of homologues.—Auth. abst.

21512. SOKOLOVSKAIA, I. I. [A contribution to the karyotypes of certain birds.] [With Eng. summ.] *Trudy Instituta Genetiki (Bull. Inst. Genetics)* 13: 277-284. 4 fig. 1940.—The morphology of the chromosomes of ducks, pheasants, and pigeons is compared.—Courtesy *Exp. Sta. Rec.*

GENETICS

Editors: ORLAND E. WHITE, *Plant*; SEWALL WRIGHT, *Animal*

(See also Entries 21477, 21482, 21483, 21484, 21488, 21489, 21490, 21493, 21500, 21509, 21580, 21583, 21584, 21850, 22063, 22362, 22441, 22453, 22472, 22474, 22477, 22496, 22501, 22589, 22601, 22653, 22777, 22782, 22888, 22928, 22948, 22973, 22975, 23017, 23021, 23076, 23090, 23150, 23153, 23165, 23168, 23191, 23205, 23326)

PLANT

21513. BEALE, G. H. (John Innes Hort. Inst., Merton, Eng.) Gene relations and synthetic processes. *Jour. Genetics* 42(1/2): 197-214. 1941.—Mutation, dominance and epistasy are analyzed to discover whether they may serve as indicators of the direction of synthesis. Mutation away from the wild type usually results in the formation of simpler substances, i.e., those requiring fewer steps for their synthesis. Hence the mutant-type substance is likely to be an intermediate substance in the synthesis of the wild-type substance. Dominance is not a good indicator in forms with a considerable number of non-recessive mutants, but generally dominance of the wild type is fairly complete and the direction of mutation, if not known, can be inferred. Epistasy giving a 9:3:4 ratio indicates that the reaction brought about by the epistatic gene is an essential precursor of the reaction characteristic of the hypostatic gene. Applied to anthocyanin pigments, these principles allow one to deduce that cyanidin derivatives are synthetically simpler than delphinidin derivatives. The relation of pelargonidin to the 2 other types is not clear. Monosides are perhaps simpler than diglycosides. The pH change in mutation is always acid \rightarrow alkaline, natural selection having generally favored a lower pH in petals than in the rest of the plant. The anthocyanin data confirm (1) that changes

of the wild type are not random but preponderantly in the direction complex \rightarrow simple, and (2) that dominance is associated with wild type alleles irrespective of the nature of the chemical changes concerned.—H. B. Glass.

21514. BOYE, C. L. (Ohio State U., Columbus.) An allelic series in *Coleus*. *Jour. Genetics* 42(1/2): 191-196. 1 pl. 1941.—Color in *Coleus* leaves depends on 2 independent loci, one having 3 alleles, *P* purple, *p^g* green, and *p* pattern, the other the 2 alleles *I* intense and *i* dilute. *P* and *p^g* blend to give gray. Both are dominant to *p*. *P* is epistatic to *I-i*, but *p^g* is not. *I* therefore produces purple with *P*, but intense green with *p^g*, intense gray with *Pp^g*, and intense pattern with *p*. *i* produces dilute green with *p^g* and dilute pattern with *p*.—H. B. Glass.

21515. CRANE, M. B., and D. LEWIS. (John Innes Hort. Inst., Merton, Eng.) Genetical studies in pears. III. Incompatibility and sterility. *Jour. Genetics* 43(1/2): 31-43. 2 pl., 3 fig. 1942.—Tests of self-incompatibility were carried out on 19 diploid, 8 triploid, and 2 tetraploid vars. of pears. 9 diploid and 4 triploid completely failed to set fruit, and only 1 diploid and 1 tetraploid were relatively self-fertile. The exceptional diploid, var. *Fertility*, produces seedless fruits. Its autotetraploid sets a full crop of fruit with seeds when selfed. Parthenocarpy following self-pollination is frequent in pears, but the fruits are generally inferior in

size and shape.—193 intervarietal cross-pollinations revealed only 2 cases of complete cross incompatibility, involving in each case a polyploid as ♀ parent. Incompatibility is more discontinuous in pears than in apples. In some vars. ♂ fertility is higher than ♀ fertility, in others the converse is true. One diploid shows abnormal pollen development following normal meiosis.—Triploid sterility involves both poor pollen and poor seed. Poor crops invariably result when $3n$ vars. are used as ♂ parents.—H. B. Glass.

21516. DAWSON, C. D. R. *Tetrasomic inheritance in Lotus corniculatus L.* *Jour. Genetics* 42(1/2): 49-72. 1 pl. 3 fig. 1941.—Both cyanogenetic and acyanogenetic forms of the tetraploid *L. corniculatus* ($2n=24$) exist in Great Britain. The HCN liberated upon injury from the former var. probably comes from a glycoside. Cyanogenesis is detd. by a dominant gene giving tetrasomic inheritance in F_2 . Segregation was sharp, except for certain plants yielding traces of HGN upon prolonged testing (Na picrate test). These plants probably carried modifying factors. Quadrivalents are rarely formed at meiosis in *L. corniculatus*.—*L. tenuis* ($2n=12$) also has cyanogenetic and acyanogenetic forms. *L. uliginosus, angustissimus* and *hispidus* are solely acyanogenetic. Of the diploids, only *L. tenuis* and *uliginosus* are perennials like *corniculatus*, and only *tenuis* is ever cyanogenetic. *L. uliginosus* differs from *corniculatus* in many ways where *tenuis* resembles the latter closely. *L. corniculatus* is evidently an autotetraploid derived from *tenuis*; and tetrasomic inheritance seems to be a better criterion of autoploidy than the lack of quadrivalents at meiosis.—H. B. Glass.

21517. DÖRING, HELMUT. *Über die Dominanzverhältnisse von Allelen verschiedenem Mutabilität.* *Biol. Zentralbl.* 61(1/2): 65-68. 1941.—In *Antirrhinum majus* the labile gene *perlutea* produced twice as many reverse mutations in the homozygous as in the heterozygous condition. Several labile genes of the *unicolor* series likewise produced mutations in various compounds independently of the alleles with which they were associated. Gene lability is a property of the gene itself; the terms "dominance" and "recessiveness" do not apply.—A. H. Hersh.

21518. FABERGÉ, A. C. (*Univ. Coll., London*), and G. H. BEALE (*John Innes Hort. Inst., Merton, Eng.*). *An unstable gene in Portulaca: Mutation rate at different temperatures.* *Jour. Genetics* 43(1/2): 173-187. 2 fig. 1942.—A variety of *P. grandiflora* with colored spots on stems and petals derived by mutation was subjected to temps. of 25° , 30° , 35° , and 40°C for 6 weeks. Four clones were used, 4 plants per clone. Stem spots were counted as a measure of mutation frequency. With rising temp. there was a significant reduction in mutation rate per unit of stem length, per cell, and per unit of time. The fractional Q_{10} is incompatible with Delbrück's theory of mutation by direct action of thermal agitation. If the unstable gene of *Portulaca* is aschistic (due to breakdown of an existing allele) the effect of temp. must be quite indirect. If, as seems more likely, this mutant is of the schistic type (due to inexact copying in gene reproduction), the effect of temp. might still be a fairly direct one.—H. B. Glass.

21519. HOWARD, H. W. (*Sch. Agric., Cambridge, Eng.*) *The effect of polyploidy and hybridity on seed size in crosses between *Brassica chinensis*, *B. carinata*, amphidiploid *B. chinensis-carinata*, and autotetraploid *B. chinensis*.* *Jour. Genetics* 43(1/2): 105-119. 6 fig. 1942.—Amphidiploid *B. chinensis-carinata* ($2n=54$) and autotetraploid *B. chinensis* were obtained by colchicine treatment. Meiosis is regular in the former, and fertility is high. Pollen-tube growth was good in all crosses involving *B. chinensis*, *B. carinata*, the amphidiploid and the autotetraploid *B. chinensis*, and a high set of seeds occurred in crosses of $2n \times 2n$, $4n \times 4n$, and $4n \text{ ♀} \times 2n \text{ ♂}$ (seeds about $\frac{1}{2}$ normal size in latter). Crosses of $2n \text{ ♀} \times 4n \text{ ♂}$ produced no good seeds, only developed ovules. In these crosses *B. carinata* ($n=17$) although an allotetraploid, behaved physiologically as a diploid.—Reduction in seed size appears to involve 2 effects: (1) disturbance of embryo: endosperm ratio, or "hybridity effect"; and (2) "polyploidy effect" seen in triploids.—H. B. Glass.

21520. LANGHAM, D. G. (*Inst. Exp. Agric. y Cria, El*

Valle, Caracas, Venezuela) *Fertile tetraploids of sesame, *Sesamum indicum* Loew, induced by colchicine.* *Science* 95 (2460): 204. 1942.—Treatment of *S. indicum* Loew plants with colchicine produced branches whose cells contained 52 chromosomes instead of 26. Some of these were found fertile. By subsequent colchicine treatment, hybridization and selection, haploids, diploids, triploids, tetraploids, hexaploids and octoploids were obtained.—E. J. Umberger.

21521. LEWIS, D., and I. MODLIBOWSKA. (*John Innes Hort. Inst., Merton, Eng.*) *Genetical studies in pears. IV. Pollen-tube growth and incompatibility.* *Jour. Genetics* 43 (1/2): 211-222. 2 fig. 1942.—Self-incompatibility in diploid pears is due to arrested pollen-tube growth. An intervarietal cross between 2 diploids indicates its gametic determination. The autotetraploid Fertility is self-fertile, having both compatible and incompatible pollen-tubes. The former grow faster than compatible tubes of diploids in both $4n$ and $2n$ styles. To account for the effect of polyploidy on self-sterility, it is assumed that S_1S_2 pollen is compatible and S_1S_1 or S_2S_2 pollen incompatible in $S_1S_2S_2S_1$ styles.—Var. *Beurré Bedford* ($2n$) also produces fast-growing pollen-tubes which penetrate style and embryo sac but rarely effect fertilization. They come from unreduced pollen mother cells, with n to $4n$ nuclei.—H. B. Glass.

21522. MURPHY, R. P. (*Montana Agric. Exp. Sta.*) *Methods of breeding crested wheatgrass, *Agropyron cristatum* (L.) Beauv.* *Jour. Amer. Soc. Agron.* 34(6): 553-565. 1942.—Studies were made of the variability among plants tested in individual plant nurseries and as replicated clonal progenies; and of the effects of self-fertilization. The Fairway type had 14 somatic chromosomes and the forage type had 28. Out of 33 plants only one from the forage type was an aneuploid. Both types were highly self unfruitful with only one plant which was from the forage type setting an appreciable amt. of selfed seed. Some plants of the forage type were cross fertile and some were not when these were isolated in pairs. Most 1-year and 2-year selfed plants were markedly reduced in vigor, produced pollen smaller in size and lower in fertility, and were less self-fruitful. A few 1-yr. selfed progenies in the Fairway type were as vigorous as unselected open pollinated plants. The forage type was severely injured by root rot with a correlation of $r=-0.80$ for yield and root-rot. The Fairway type was resistant to this root-rot damage. There were no significant differences among 15 plants of the forage type in β carotene content when tested in replicated clonal progenies. Highly significant differences in yield, plant height, and root-rot injury were found among plants selected from individual plant nurseries when they were tested further as replicated clonal progenies.—R. P. Murphy.

21523. NEWCOMBE, H. B. (*John Innes Hort. Inst., Merton, Eng.*) *The action of x-rays on the cell. II. The external variable.* *Jour. Genetics* 43(1/2): 237-248. 3 fig. 1942.—A study of x-ray induced chromosomal changes in the pollen-grain mitosis of *Tradescantia* shows that simple chromosome breaks (fractures) vary as the square of the dose or above; while 2-break changes (new reunions) vary only as the 1.5 power, approx. Minute fragments, which from the evidence include a large proportion of small rings, behave in an intermediate fashion. All the observed types vary at a higher power of the dose when the duration of the dose is kept constant than when the intensity is constant. The intensity effect, since it applies to both 1- and 2-break changes, cannot be due simply to healing of broken ends or to competition between restitution and reunion. It is attributed to an inhibition of both the restitution and the new reunions of broken ends by the irradiation, the inhibitory effect increasing with dosage more rapidly when the dose is administered more rapidly.—H. B. Glass.

21524. OLSON, P. J. *Exchange of certain alternative stable characters in crosses between dent and flint corn.* *North Dakota Agric. Exp. Sta. Bull.* 291. 1-38. 6 fig. 1939.—Crosses were made between flint corn, having a tillering habit and husks terminating in a long blade, and dent corn, typically nontillering and husks with no blades or short ones. Segregation occurred in F_2 and backcross generations and in F_3 populations for different degrees of tillering and different lengths of husk blades. The backcross generation,

F_1 by dent, showed a typical left-hand conc., i.e., in the direction of low tiller number and short husk blades, and F_1 by flint, a conc. in the opposite direction. F_2 populations distinctly different in pattern were obtained from the various crosses, showing that segregation for different genic combinations detd. different degrees or limits of tillering and husk blade length. The inheritance of number of rows on ears resembled that of tillers and husk blades. No populations were found that bred true for any particular row number, even for 8 rows. The inheritance of the combined characters, tillering and husk blades, was studied in a number of crosses, and the expected and observed results on the basis of independent inheritance and dominance of presence over absence were recorded for F_2 and 2 backcross generations. A multiple factor interpretation is offered to explain the inheritance, independently, of these two characters. Among a total of nearly 5,000 F_2 and later plants in 1935, 38 reverse type A plants were recovered, i.e., without tillers or husk blades bearing true flint ears with from 8 to 12 rows of kernels; whereas nearly 200 reverse type B plants were found, i.e., with tillers and husk blades bearing dent ears with 12 or more rows of medium to rough dented kernels. A race breeding true for reverse type A was not established. "The assumption of multiple factors for the characters, tillering, husk blades, and kernel row number calls for the production of F_2 generations consisting of thousands of individuals in order to permit the recovery of the combination represented by reverse type A."—Courtesy *Exp. Sta. Rec.*

21525. OWEN, F. V. Inheritance of cross- and self-sterility, and self-fertility in *Beta vulgaris*. *Jour. Agric. Res.* 64(12): 679-698. 1 fig. 1942.—The studies deal with incompatibility relationships in curly top-resistant vars. of sugar beets. Cross-sterility was frequently nonreciprocal in behavior and an explanation based on a duplicate series of oppositional factors explained most of the results. A highly self-fertile condition was produced by a single Mendelian factor designated S^f . Self-sterile plants were designated S^b . Heterozygous S^fS^a plants breed true for self-fertility, presumably with the production of only S^fS^f and S^fS^a offspring. One instance is reported where self-fertility arose suddenly in a self-sterile line, presumably by mutation. Under greenhouse conditions end-season self-fertility was pronounced with certain self-sterile plants.—F. V. Owen.

21526. PUTNAM, L. G. (U. Saskatchewan, Saskatoon, Sask.) A study of the inheritance of solid stems in some tetraploid wheats. *Sci. Agric. [Ottawa]* 22(10): 594-607. 1942.—Results of exptl. research are presented from studies of crosses of a solid-stemmed var. of *Triticum durum* \times 3 hollow-stemmed vars. of *T. durum* and one of *T. turgidum*, proving that the inheritance of the pithy-stemmed character is unifactorial, with pithiness partially dominant. In the F_2 the solid and intermediate classes of segregates overlapped phenotypically, but the hollow segregates formed a distinct, true-breeding group. Some minor undetd. genetic factors add to the effect of environment on variability of pith development. In the literary research, the conclusion is reached, for which the author has no supporting exptl. evidence of his own, that the breeding of a saw-fly resistant *vulgare* var. which could be depended upon to exhibit solid pithiness under all conditions, using *T. durum* as the source of pithiness, would depend upon the occurrence and detection of a long-chance meiotic irregularity.—L. G. Putnam.

21527. R., G. N. Plant genetics as applied to the agricultural industry in India. *Sci. and Culture* 7(8): 373-376. 1942.—The most important breeding method yielding good results in India is single plant selection. It has been tried in wheat, paddy and cotton. By this selection method an increase in yield of 10-20% was found possible. Hybridization, originally confined to vars. of the same species of cultivated plants, now offers possibilities of more distant crosses as between cultivated and wild interspecific strains. Examples of this type of hybridization are: in sugar cane (*Saccharum spontaneum* \times *S. officinarum*), in rice (*Oryza sativa* \times *O. longistaminata*). Some, like the rye-wheat hybrids of Russian expts. become amphidiploid; *Galeopsis tetrahit* and *Spartinia townsendii* originated thus. Artificially-induced chromosome changes (with X-rays, etc.)

might break up undesirable combinations to produce strains useful to the agriculturalist; favorable results along this line have been reported for rice and sugar cane from Madras and Mysore.—M. D. Rogick.

21528. RAPTOPOULOS, T. (John Innes Hort. Inst., Merton, Eng.) Chromosomes and fertility of cherries and their hybrids. *Jour. Genetics* 42(1/2): 91-114. 2 pl., 12 fig. 1941.—The Duke cherry ($4n$) appears to be an auto-tetraploid, as it has a high chiasma frequency (1.59) and a high % of quadrivalents (6 per p. m. c.). The Sour cherries, *P. cerasus* ($4n$), have a low chiasma frequency (1.34) and a low proportion of quadrivalents (2.5). $3n$ hybrids of Duke \times *P. avium* and of Sour \times *P. avium* behave as autotriploids, with 6.4 and 4.8 trivalents per cell respectively. Duke \times Sour hybrids have as high a frequency of multivalents as Duke. Sour cherries are evidently auto-tetraploids also, but have been modified by selection for increased fertility through the reduction of chiasma frequency and of multivalent formation. Dukes are judged to be autotetraploid forms of *P. avium* and Sour cherries to be autotetraploid forms of some diploid cherry closely related to *P. avium*. The inverse relation between the number of quadrivalents and fertility found in the 9 spp. and vars. studied indicates that no aneuploid gametes in cherries are viable.—*P. cantabricensis* ($4n$), from its regular meiosis and high fertility, is judged to be an allotetraploid.—H. B. Glass.

21529. SAN SOME, EVA R. S. SATINA, and A. F. BLAKESLEE. (Carnegie Inst., Cold Spring Harbor, N. Y.) Disintegration of ovules in tetraploid-diploid and in incompatible species crosses in *Datura*. *Bull. Torrey Bot. Club* 69(6): 405-420. 21 fig. 1942.—In the highly incompatible $4n$, $2n$ combinations in *D. stramonium* and in the incompatible species crosses, *D. stramonium* \times *D. metel* and *D. stramonium* \times *D. ceratocaula* fertilization is accomplished with high frequency and the early post-fertilization stages appear normal. After a few divisions of the proembryo, disintegration of the embryo-sac contents takes place. Accompanying this disintegration the cells of the endothelium surrounding the embryo-sac enlarge and either divide forming a multilayered tissue filling the embryo-sac or themselves disintegrate. The chalazal opening is always present even at late stages of disintegration.—Authors.

21530. SHULL, J. MARION. Inheritance in daylilies. *Herbertia* 8: 93-95. 1 pl. 1941.—A cross of *Hemerocallis serotina* \times *H. fulva europa* gave "Thulva," which when in turn crossed with (1) Florham gave "Gorgio" and with (2) Iris Perry gave "Gipsy Lass." "Thulva" has broader petals than either parent and "Gipsy Lass" has broader petals than Iris Perry, facts taken to suggest that the wide petal character is heritable. Some notes on perianth color in the different generations are presented.—W. S. Flory, Jr.

21531. STOUT, A. B. (New York Bot. Gard.) Report on inter-specific hybridizations in *Hemerocallis*. *Herbertia* 8: 95-103. 2 pl. 1941.—140 combinations between 15 distinct species or botanical vars. have yielded seed and are tabulated. Only 2 combinations have failed to yield seed in both of the reciprocal relations. *H. nana* appears to be an unproductive parent, and the hybrids which have been obtained from it are largely sterile. Selective breeding for several generations following hybridization has been very effective in producing superior vars.; e.g., new degrees of dark red pigmentation were produced in this manner. 39 references.—W. S. Flory, Jr.

21532. ZUCKERMAN, H. G. (U. California, Berkeley.) Selection of parent seed potatoes. *Amer. Potato Jour.* 19(4): 61-67. 1942.—In all present existing potato seed stocks, including the old established vars. that have built up an immunity to many enemies as well as in the newly genetically created vars. that still must go through the immunizing process, there occur individuals whose descendants vary from the normal characteristics of the var. These undesirable parents come from causes now undetd. and seem to exist independently of virus, fungus or bacteria. To some degree they seem to be independent of their environment. Their removal from foundation seed stocks seems to be desirable. The elimination and control of these undesirable parents depends in some unknown degree on the factors governing the vegetative reproduction

of the potato. Since so little is known of these hereditary factors it seems that some of the scientific energy now almost entirely devoted to the creation of new vars. through genetic selection should be directed to a study of the potato under vegetative reproduction. To justify this thesis, the work done by Herbert S. Jennings on the "Hereditary Status of the Rhizopods" is briefed in this article. Jennings' work demonstrating vegetative selection based on hereditary characteristics suggests the justification for a long-time, difficult and complicated attempt to improve existing seed stocks by a selection of parent seed based on the hereditary status of the descendants where grown in commercial potato areas.—H. G. Zuckerman.

ANIMAL (EXCEPT MAN)

21533. CLANCY, C. W. (U. Oregon.) The development of eye colors in *Drosophila melanogaster*. Further studies on the mutant claret. *Genetics* 27(4): 417-440. 1942.—The original evidence for the existence of *ca*⁺ substance, a diffusible substance postulated by Beadle and Ephrussi (1936) as being involved in the development of wild-type eye color, is re-examined in the light of more recently accumulated information on eye-color development in *Drosophila*. Unpublished data made available by G. W. Beadle along with expts. of the author show that (1) the type of pigmentation exhibited by a wild-type optic disc when grown in a claret host is non-specific and occurs in other hosts known either to lack *v*⁺ hormone or to contain it in reduced amt. as compared to wild type; (2) differences in developmental age between the wild-type implant and the claret host do not account for the partial pigment differentiation of the implant; (3) in comparative tests for *v*⁺ hormone activity (release by Malpighian tubes and fat-bodies, and feeding tests of crushed whole pupae) claret gives considerably lower values than wild type; (4) wild-type optic discs grown in white-claret hosts (assumed to contain more *v*⁺ hormone than claret) approach wild-type pigmentation very closely. The original argument for assuming the existence of a specific *ca*⁺ substance, different from *v*⁺ and *cn*⁺ substances, is no longer tenable. In addition, a method for the extraction and measurement of *Drosophila* eye-pigments is described in connection with studies on the action of the mutant gene claret. Comparative measurements of the pigment extracts obtained from the heads of wild type, claret, and double-recessives of claret with vermillion, cinnabar, and brown show that the mutant gene claret reduces the amt. of the red pigment to about 17%, and the brown pigment to about 28% of that present in wild type. The relation of the claret gene to the scheme of eye-color development outlined by Beadle and Tatum (1941) is discussed briefly.—C. W. Clancy.

21534. CUMLEY, R. W., and M. R. IRWIN. (U. Wisconsin.) Immunogenetic studies of species: Segregation of serum components in backcross individuals. *Genetics* 27 (2): 177-192. 1942.—The sera of 2 dove spp., Pearlneck (*Streptopelia chinensis*) and Ring dove (*S. risoria*) have been found by immunological techniques to have antigenic components specific to each and the remainder common to the 2. The species-hybrids contain all, or nearly all, of both species-specific and common components of both parental spp. Following successive backcrosses to Ring doves, a segregation of the antigens specific to Pearlneck was noted. In 4 backcross families, the segregation of individuals with or without the serum component was that expected from the action of one or more genes on a single chromosome originally derived from the Pearlneck. Since all backcross individuals are the descendants of a single Pearlneck ♂, and from species hybrid ♂♂ only, the possibility of cytoplasmic influence on the serum constituents can be ruled out.—Auth. summ.

21535. DUNN, L. C. (Columbia U., N. Y. C.) Studies of spotting patterns. V. Further analysis of minor spotting genes in the house mouse. *Genetics* 27(2): 258-267. 1942.—A new type of white spotting (type "k") which lacks the main spotting allele *s* was inbred in several families for 10 generations, then tested by crossing with an unspotted race and shown to contain several mutant alleles with individually small effects. One or more of these were dominant, others recessive. One of the recessives acted as

a sub-threshold allele; i.e., when alone it produced no spotting but did produce spotting when combined with other mutant alleles. Such sub-threshold alleles appear to act as specific modifiers of alleles whose expression is increased by them, although the main mode of interaction of spotting alleles is additive.—L. C. Dunn.

21536. FRYER, H. C. (Kansas State Coll., Manhattan), and JOHN W. GOWEN (Iowa State Coll., Ames). An analysis of data on x-ray-induced visible gene mutations in *Drosophila melanogaster*. *Genetics* 27(2): 212-227. 1942.—This paper presents a critique of the χ^2 method of analysis of mutation data in *Drosophila*. The results show (1) that the genes within the sets observed have the same basic mutation rate, (2) that the mutation rate at a specific locus is directly proportional to the dosage of radiation applied, (3) that in so far as the sets of genes used are representative of their respective chromosomes, the fundamental rates of mutation on these chromosomes are the same, and (4) that for a particular gene and a fixed dosage, the wavelength of X-ray used does not affect the mutation rate. The first hypothesis is not adequate to explain the variation observed when the "cl" locus and possibly the "dp" and "px" loci, are among those observed; but the other hypotheses fit the data quite satisfactorily. Tests of other authors' data show the following results from the application of this method: Interrupted vs. continuous irradiation gives comparable mutation rates; temps. of 35-38° C may increase mutation somewhat; spp. of *Drosophila* may react differently to x-rays; mutation of genes from recessive to wild type occurs, with the exception of a few low, at comparable frequencies; mutation rates of the alleles in the "white" series to white occur at comparable rates and mutation of these alleles to genes other than white also occur at comparable rates.—J. W. Gowen.

21537. GORDON, MYRON. (New York Zool. Soc.) Mortality of albino embryos and aberrant mendelian ratios in certain broods of *Xiphophorus hellerii*. *Zoologica [New York]* 27(2): 73-74. 1942.—When albino swordtails, *StSt ii*, are mated to golden, *stst II*, the *F*₁ offspring are gray, wild-colored, *Stst II*. When the latter are inbred some *F*₁ ♀♀ yield gray, gold and albinos in the ratio of 9:3:4. Another group of similar ♀♀ produce broods deficient in the number of albinos; while still another group of gray ♀♀ produce hardly any albinos at all. When ♀♀ which had yielded very few albinos were dissected albino embryos were found in numbers close to expectancy. Thus the deficiency of albinos in certain broods must be attributed not only to the low viability of the albinos themselves but also to some failure in the ability of the albinos' mothers to carry their complete broods through to birth.—Myron Gordon.

21538. HARNLY, MORRIS HARNLY. (Washington Square Coll., New York U.) Wing form and gene function in nine genotypes of *Drosophila melanogaster*. *Biol. Bull.* 82(2): 215-232. 1942.—The effects of temps. between 16° and 32° C and the thermolabile or temp.-effective period were detd. for 9 genotypes affecting wing form and wing venation. The nature of the response to temp. changes is a function of the specific allele and is not a function of the locus or character affected. The thermolabile period for all the wing form genes tested was restricted to the 3d larval instar. This thermolabile period for all the wing venation genes fell after puparium formation. The temp.-effective period is a function of a character and the stage in ontogeny when it is detd. and is not a function of the locus or the alleles present. The duration of this period, if not the maximum, and the rate of the response are detd. by the allele and the environment. Work in progress on the growth and differentiation of the dorsal mesothoracic discs seems to indicate that the thermolabile period is closely associated with marked growth and morph. changes in the disc. The limits for the future phenotype of each character are demarcated at fertilization by the genotype established. The phenotype of each individual is subsequently developed at a point within these extremes as the resultant of the interacting forces of the genotype and the individual's environment.—M. H. Harnly.

21539. ILJIN, N. A. (Inst. Gen. Biol., Moscow, U.S.S.R.) Wolf-dog genetics. *Jour. Genetics* 42(3): 359-414. 11 pl., 8 fig. 1941.—A study has been made of 101 wolf-dog

(mongrel German sheep dog) hybrids, 13 F_1 , 61 F_2 , 24 F_3 , 3 F_4 . All hybrids were fully fertile. Typical Mendelian segregation was found for hair color and pattern, eye color, ear form, size, and skull characters. There was no change in dominance or recessiveness in the hybrids. The wolf ancestor was heterozygous for Aa , zonar/non-zonar hairs, the dog for aa^t , non-zonar/tan in zonar hairs. The segregation observed for these genes indicates identity of the allelic series in wolf and dog. The wolf was BB (black), the dog Bb , heterozygous for recessive brown fulvous with light iris; the wolf was SS , self color, the dog Ss , heterozygous for recessive white spotting. The wolf was probably $Int\ int$, heterozygous for the intensifier of hair zonarity (dirty white band in zonar hair/bright yellow band); the dog $int^m\ int^m$ (yellowish brown band in zonar hair). The same triple allelic series or one like it governs the intensity of the red pigment in black and tan segregants. Curly wool, recessive, also segregated out in the hybrids, presumably having come from the sheep-dog ancestor.—In body size the F_1 hybrids were like large dogs, smaller than average wolves. In F_2 there was segregation for size from huge to small, the former twice the size of the latter. In general, the body frame of the sheep-dog is not significantly different from that of the wolf. The linear arrangement of the footprints of a walking wolf as against the staggered one of a dog's appears to be due to the leg set, the legs being pressed to the chest and the paws turned out in the wolf. This is sometimes found in poorly developed working dogs. The tail set appears to be partly inherited, partly modifiable. All hybrids wagged their tails, but pure wolves also learn to wag their tails. Ear form in the hybrids was semi-erect as in collies (H^aH^a , H^aH , and $H^a h$), lop (H^H), semi-lop (Hh), or erect (hh). The original cross was presumably hh (wolf) $\times H^aH$ (dog).—Skull characters studied included size of orbital angle, shape and size of bullae tympani, and shape and length of processus zygomatico-maxillaris. In F_1 , orbital angle was intermediate but closer to that of dogs; in F_2 , segregation occurred, overlapping the angles characteristic for both wolves and dogs. The proc. zyg. max. in F_1 hybrids is intermediate and obtuse; but in F_2 , it tended to revert in the majority to the acute angle of the wolf type, and animals with flat open sutures like the dog's were not recovered. Perhaps 2 pairs of factors are involved, the dog type being the double recessive. The larger size of the bullae tympani in the wolf is almost completely dominant, but in flatness of these structures the F_1 resembles the dog more. As to presence and absence of ribs on the bullae the F_1 is intermediate. F_2 segregates for all these characters. The various skull characters are inherited independently; 12 pairs of factors are postulated.—Barking was found to be purely modifiable. Season and frequency of rut and nervous disposition show some indications of segregation. Duration of pregnancy, the length of the blind period in the young, the order of appearance of the milk teeth and the moulting phenomena are all alike in wolves and dogs. The high degree of similarity in the genetic constitution of wolf and dog and their complete interfertility make plausible the origin of the various races of the dog from the single wild species, *C. lupus*.—H. B. Glass.

21540. IRWIN, M. R., and R. W. CUMLEY. (U. Wisconsin.) Immunogenetic studies of species: Qualitative differences in the serum of backcross progeny following a generic cross in birds. *Genetics* 27(2): 228-237. 1942.—Antigenic components common to both spp. and others species-specific to each have been observed in the sera of pigeon (*Columba livia*) and Ring dove (*Streptopelia risoria*) by immunological methods. The species-hybrids contain all the common components and all or nearly all the specific components of both parental spp. The respective sera of 2 backcross individuals, obtained from matings of species-hybrid ♂♂ to Ring dove, possessed 1 or more qualitatively different antigens specific to pigeon. This finding is in accordance with expectation on a genetic interpretation and provides evidence that genes influence the chemical constitution of proteins.—Auth. summ.

21541. LEINER, M. Kurze Mitteilung über den Brutpflegeinstinkt von Stichlingsbastarden. *Zeitschr. Tierpsychol.* 4: 167-169. 1940.—Most of the hybrid sticklebacks were sterile, but 3 ♂♂ showed slight signs of reproductive

changes, including random, disorganized nest-building activity.—G. M. Gilbert (in *Psychol. Absts.*).

21542. MOORE, JOHN A. (Queens Coll., Flushing, N. Y.) An embryological and genetical study of *Rana burnsii* Weed. *Genetics* 27(4): 408-416. 8 fig. 1942.—Breeding expts. have demonstrated that *R. burnsii* is a mutant of typical *R. pipiens*. *R. burnsii* is found in the north central states and differs from *R. pipiens* in lacking dark spots on the back. The non-spotted condition is due to a single dominant gene. Animals carrying this gene can be distinguished in the larval stages.—J. A. Moore.

21543. MORGAN, T. H. (California Inst. Tech., Pasadena.) The genetic and the physiological problems of self-sterility in *Ciona*. V. The genetic problem. *Jour. Exp. Zool.* 90(2): 199-228. 1942.—Cross- and self-fertilizations of wild-type *Ciona* indicate that >1 pair of factors for self sterility are present, for otherwise more identical individuals would be met with. These pairs must be in different chromosomes and one or more pairs may have a series of alleles having the same function. Evidence from acid-selfed eggs excludes the possibility of one series of alleles. When individuals are raised from naturally selfed eggs (that occasionally occurs) many more cases of one-way cross-sterile and reciprocal cross-sterile are found; this is to be expected since there are usually more identical combinations than in random wild type crosses. When the offspring of 2 individuals are reared together and tested, more cases of one-way cross-sterile and reciprocal cross-sterile occur than in wild-type combinations, which is again explained as above. The occurrence of some cases of self-fertilization is accounted for on the assumption of mutation occurring in one or more alleles. The frequent occurrence of abnormal embryos is shown to be due to bacterial development in the presence of materials that have come over with the eggs, and also from the breaking down of the sperm.—Auth. (courtesy Wistar Bibl. Serv.).

21544. SLIFER, ELEANOR H. (State U. Iowa.) A mutant stock of *Drosophila* with extra sex-combs. *Jour. Exp. Zool.* 90(1): 31-40. 1 fig. 1942.—A mutant stock of *D. melanogaster* in which the ♂♂ possess extra sex-combs has been carried on for 40 generations. The gene for extra sex-combs is recessive and is carried on the left end of the 2d chromosome. Homozygous ♂♂ and ♀♀ are both sterile. With the help of a stock balanced with Bristle (Bl/esc) it has been possible to show that the penetrance of esc can be greatly increased by supplying the larvae with large amounts of fresh yeast. This indicates that the period when extra sex-combs are detd. probably occurs during one of the larval stages. The sex-combs of ♂♂ which are phenotypically esc show antero-posterior gradients with respect to their distribution, size and variability.—Auth. (courtesy Wistar Bibl. Serv.).

21545. STURKIE, PAUL D. (Agric. Exp. Sta., Auburn, Ala.) A new type of autosomal nakedness in the domestic fowl. *Jour. Heredity* 33(5): 202-208. 2 fig. 1942.—The character varies in expression from an extreme degree of nakedness, although not complete, to almost normal. The nudity is due wholly to the absence of pteryiae in the areas of the body concerned. Down and semiplumes are absent in all apteria of the body. The mutation, of recent origin, is a simple autosomal dominant. There is a degree of lethality associated with the character in hatched chicks. The embryonic mortality is no higher than in normal chicks. The mortality is high at all stages of life but particularly so during the first 15 days. The lethal action of the gene is mitigated by feeding wet mash for certain periods of time. After discontinuance of the wet mash the mortality increases considerably. The feed consumption of the mutant chicks in dry mash is about $\frac{1}{2}$ less than that of normal chicks; on wet mash it is increased, but is still below normal. The body wts. of naked birds are less than those of normal ones at all wt. periods except at hatching time. Evidence is presented to show that high death rate is not due to purely physical effects resulting from lack of feathers, and while it is demonstrated that the lethality is associated with a lowered feed consumption, this appears not to be the primary cause of death, but rather a consequence of some basic physiol. disorder, possibly one concerned with digestion and assimilation.—P. D. Sturkie.

21546. WRIGHT, SEWALL (U. Chicago), TH. DOBZ-

HANSKY (*Columbia U., N. Y. C.*), and **W. HOVANITZ**. (*California Inst. Tech., Pasadena.*) Genetics of natural populations. VII. The allelism of lethals in the third chromosome of *Drosophila pseudoobscura*. *Genetics* 27(4): 363-394. Mar. 1942.—Samples of race A, *D. pseudoobscura* were obtained in 3 ecologically very different localities near Mount San Jacinto and from a locality in Death Valley, all in California. Tests of 1292 wild 3d chromosomes from San Jacinto revealed 13.85% lethals and semilethals (standard error 0.97) in comparison with $17.0 \pm 1.3\%$ from 857 Death Valley chromosomes (including earlier data), and 30 ± 4.2 from 120 chromosomes from Mexico and Guatemala. These exclude a particular chromosome arrangement (Standard) because of technical difficulties. There were no significant differences among "localities" or according to season at San Jacinto in contrast with significant differences in the frequencies of chromosome arrangements. The av. % of allelism from populations so remote that common origin is largely excluded was 0.413 ± 0.081 . The % was significantly higher (0.88 ± 0.20) for chromosomes from different stations in the same "locality" and still higher ($2.13 \pm 0.32\%$) for chromosomes from the same station. In both cases, it was somewhat higher among flies collected simultaneously than at intervals of 1-6

months but not significantly. This figure is lower than that previously published (3.11 ± 0.63) for chromosomes from within Death Valley localities. The minimum number of loci capable of lethal mutation in the 3d chromosome is estimated to be 285, corresponding to a mean mutation rate of 1.077×10^{-5} per locus per generation, a mean frequency per lethal of 0.00052, a standard deviation of frequencies of 0.00116 within stations and of 0.00061 within localities. The frequency of lethals is much less than expected of completely recessive lethals in a random breeding population subject to the observed mutation rate (0.00307 ± 0.00038 lethals per generation in the laboratory). The data do not permit separation of the effect of inbreeding (coefficient *F*) and selection against heterozygotes (*s*) but indicate a joint estimate ($s+F$) = .0177 for stations, 0.0194 for localities and 0.0201 for San Jacinto as a whole; to be compared with 0.0163 for Death Valley and 0.0074 for Mexico and Guatemala. The higher % of allelism within stations and localities than at greater distances indicates limitation in the effective size of population (*N*). Effective *N* of the largest "locality" with stations scattered over about 6 sq. km. is estimated at about 3×10^4 , assuming that immigration is responsible for less than 1% of the population per generation.—*Sewall Wright*.

BIOMETRY

JOHN W. GOWEN, *Editor*

(See also B. A. 16(5): Entries 11799, 12888; (6): 14163, 14168; (7): 15805, 15817, 16010, 16497, 16580, 17149, 17177; (8): 18630, 18870, 18922; (9): 19617, 20192, 20647; and in this issue 21536, 21593, 21594, 23203, 23355)

21547. EZEKIEL, M. Methods of correlation analysis. 2nd ed. xix+531p. Wiley and Sons: New York, 1941. Pr. \$5.—Almost all of the patterns of dependency are treated in degrees of precision from graphic approximation to exact mathematical determination. An introductory section on variability and reliability orients the untrained worker. The next section deals with the determination of functional relations between 2 variables (1) by the use of averages, (2) according to the straight-line function, and (3) for curvilinear functions. The 3d section treats of change in a variable when 2 or more variables change (1) by successive elimination, (2) by cross classification and averages, (3) by use of the linear regression equation, and (4) by the use of curvilinear regression. Chief topics treated in the remainder of the book are short-cut methods for determining regression curves, non-quantified variable relations, reliability of prediction, sample selection, and "joint" functions. The text proper closes with chapters on the application of correlation to fields other than agriculture and experimental design. The appendices provide methods of computation, graphs for adjusting measures of correlation, derivation of basic formulas, and a glossary of essential equations.—*L. Kogan* (*in Psychol. Abst.*).

21548. FISHER, R. A. Statistical methods for research workers. 8th ed. xv+344p. 12 fig. Oliver and Boyd: Edinburgh, 1941. Pr. 16s.—The initial sentences in the preface to the 1st edition above the date Feb. 1925 state that for several years the author had been working in co-operation with a number of biological research depts., that his book was in every respect the product of this circumstance, and that the methods presented in the book originated from purely mathematical researches which owed their stimulus to daily contact with the statistical problems of the laboratory worker. The author is aware that the order of presentation of the subjects treated by him does not altogether conform to that which is preferred in books that have appeared at a later date but pleads that the sequence he has adopted possesses value in clarifying the problems discussed by the earlier writers. He suggests, however, a rearrangement of the order of study for class purposes by postponing the treatment of correlation until further experience has been gained of the application of the analysis of variance. The author advises the serious student to consult, in addition, "The design of experiments" and "Statistical tables"—publications which have grown into independent existence by development from the parent book. A convenient decimal system of numbering the sections, tables and examples, including those which have

been added, permits easy reference to them irrespective of the edition used.—*Courtesy Jour. Path. and Bact.*

21549. HENRY, G. F., E. E. DOWN, and W. D. BATEN. (*Agric. Exp. Sta., East Lansing, Mich.*) An adequate sample of corn plots with reference to moisture and shelling percentages. *Jour. Amer. Soc. Agron.* 34(9): 777-781. 1942.—This article describes a method used for determining the number of ears of corn to take from plots in a replicated expt. so as to give estimates of moisture content and shelling % of this grain. A formula, in terms of the number of replications and degree of accuracy, is given for obtaining the number of ears to take at random from each plot. Tables are given containing recommendations concerning the numbers of ears, numbers of varieties and limits of accuracy for these estimations.—*Authors*.

21550. MACLAURY, DONALD. (*Kentucky Agric. Exp. Sta., Lexington.*) A "slide rule" for determining time intervals. *Poultry Sci.* 21(5): 462-463. 1 fig. 1942.—A device for making direct readings in days of intervals between 2 dates is described. The construction and operation are similar to those of the conventional slide rule, except for arithmetic markings, which are secured by modification of a meter stick. Uses for the rule in poultry breeding operations are described.—*Donald MacLaury*.

21551. RHODES, E. C. Secular changes in death rates. *Jour. Roy. Statistical Soc.* 104(1): 15-33. 1941.—The author discusses the integral $P(t) = \int_0^A B(t-x)l(x)dx$, where $P(t)$ stands for the population at time t , $l(x)$ is the chance at birth of attaining age x and A is the upper limit of age at death. The function $l(x)$ is replaced by the function,

$s(x,t) = e^{- \int_0^x q(y,t-x+y)dy}$, which takes into consideration changing mortality. Most of the paper is devoted to finding $q(y,t) = Q(y) \cdot R(y-t)$, where $Q(y)$ is a function of age and $R(y-t)$ is the generation function involving the difference between the age y at the time t . The ratio $R(y-t)/R(y-t')$ is found by fitting a logistic curve to mortality rates of English ♀♀ from 1941 to 1930; $Q(y) \cdot R(30)$ is found by fitting a Makeham curve to these data for various values of y . From this information the function $s(x,t)$ is found and used to express the value of $P(t)$.—*W. D. Baten*.

21552. SCHREK, ROBERT. Logarithmic correlation coefficients and regression equations. *Human Biol.* 14(1):

95-103. 1942.—Many skew arithmetic correlation tables in biology can be converted into a symmetric correlation table by using logarithmic instead of arithmetic classes. Such a symmetric logarithmic correlation table is analyzed mathematically by the same methods as a symmetric arithmetic correlation table. The regression equation of a logarithmic table can be easily calculated and can be represented by the geometric formula $y = ax^b$. Furthermore, the regression equation of the logarithmic correlation table has, at least in some cases, theoretical significance. By means of logarithmic correlation tables, it was found that the relationship between the weight (W) and height (H) of human fetuses may be represented by the formula $W = 0.0000705 H^{3.09}$, that is, the weight varies as the cube of the height. The relationship of the wt. (W), length (L) and breadth (B) of eggs was found to be: $W = 0.0004255 B^{2.004} L^{1.067}$. This formula is approx. the same as the theoretically derived equation: $W = 0.0005706 B^2 L^2$.—R. Schrek.

21553. WOLFENDEN, HUGH H. The fundamental principles of mathematical statistics with special reference to the requirements of actuaries and vital statisticians and an outline of a course in graduation. xv + 379p. Actuarial Society of America: New York, 1942. Pr. \$5.—This book is divided into 4 divisions which are written so that any 3 divisions are interwoven into the 4th; for any 3 divisions help clarify the 4th. The 1st division presents, through interesting and timely discussions, many fundamental statistical topics such as: probabilities in repeated trials and the normal curve; the mean square errors of functions; the theory of sampling containing the theory of Lexis, the theory of estimation, Bayes-Laplace Theorem, the method of maximum likelihood, sampling distributions, "Student's" t distribution and Fisher's Z distribution; the multinomial distribution; frequency distributions and curves in general such as Edgeworth's generalized law, Gram-Charlier Types, Pearson's systems, curves pertaining to life insurance, Gompertz curve, Makeham's curve, and the

logistic curve; fitting of curves and graduation treating of the method of least squares, method of moments, the minimum $-x^2$ principle, and graphical methods; the tests of goodness of fit including the frequency of changes of signs, standard deviations, the "least square" criterion and the x^2 test; a very brief section on recent researches pertaining to fiducial limits, testing hypotheses, orthogonal polynomials, regression and analysis of variance. The last chapter of this part contains an outline of a course in graduation in which the author reviews many methods of graduation used by actuaries and statisticians and gives the reader an excellent bird's-eye view of this important field of knowledge. This chapter is packed full of valuable information which has come from the wide experience of the author. The 2d division contains a short history of the topics presented in the 1st division. The presentation of each subject is accompanied by references to the literature. This is a very valuable section for it enables the reader to find the original articles as well as translations. The next part of the book, mathematics and interpretations, is devoted to mathematical derivations of the formulas and detailed proofs of the theorems introduced in the beginning part. Citations are given to derivations and proofs, too long to be included in the book. This fundamental material should be used at the time one is reading the beginning part for it throws much light on what has gone before. Most of the meat of the book is found in this part which is well presented. One finds here material that is not usually given in texts on statistics. Most teachers of statistics will appreciate this part. The last part is taken up with applications of the theory presented in the 1st division. These applications pertain to problems of actuaries. If actual examples are not given, references are listed in which applications of the particular theory can be found. This last part together with the others give one a clear insight into the subjects presented. The bibliography is good.—W. D. Baten.

APPARATUS AND TECHNIQUE

PETER GRAY, *Editor*

(See also Entries 21502, 21550, 21632, 21635, 21714, 22555, 22591, 22713, 22819, 22876, 22993, 23104, 23279, 23341)

MICROSCOPY AND TECHNIQUE

21554. BHADURI, P. N. Improved smear methods for rapid double staining. *Jour. Roy. Microsc. Soc.* 60: 1-7. 1940.—The following changes are suggested in the Feulgen-light-green method previously described: For root-tip smears, treat roots 3-24 hr. (according to species) with 0.1% colchicine or 1% chloral hydrate. Fix tips in Levitsky's fixative (6:4) for 2-3 hr.; rinse in water; soak 5 min. in warm water; hydrolyze in *N* HCl 20-30 min. at 60° C.; and stain in decolorized basic fuchsin soln. 20-30 min. Smear the tissue in 45% acetic acid between cover glass and slide; remove the cover glass in acetic alcohol (1:1), and leave the smear in this soln. 10 min. Then pass through 2 changes of 80% alcohol, 5 min. each. Mordant for 45-60 min. in clear saturated soln. of Na₂CO₃ in 80% alcohol, wash in 3 changes, 5 min. each, of 70% alcohol, bring to 90% alcohol and stain 10-15 min. in light green. Differentiate the stain in 80% alcohol with a trace of Na₂CO₃, followed by 90%, 95%, and absolute alcohol, and clear in graded xylol-alcohol. Mount in "Sira" medium. A more rapid method for general cytological observation is outlined, involving fixation in modified Carnoy (3:1:1) and omitting the light green stain. Modifications are suggested for preparations of pollen mother cells and pollen grains.—C. E. Allen (in *Stain Technol.*).

21555. CANNON, H. GRAHAM. On chlorazol black E and some other new stains. *Jour. Roy. Microsc. Soc.* 61: 88-94. 1941.—The author introduced chlorazol black E for microscopic work in 1937, and now re-emphasizes its special usefulness. In some of his preps. he noticed a faint pink, which proved to be due to another dye which was isolated by Imperial Chemical Industries, and named "lignin pink" because of its affinity for lignin; it is a mono-azo dye. A double stain for plant sections consists of 0.5 g. each of chlorazol black E and of lignin pink in 100 ml. water, with a 20-30 min. staining period. A series of new stains has

been developed through these studies and are now on sale by British Drug Houses, Ltd. The author names these dyes: "Hickson purple," a disazo dye of unusual chemical structure; of use in differentiating blood cells in tissues. "Marshall red," a disazo dye of the J-acid urea class of direct dyes; of use in combination with "Victoria green G." "Beyer brown," a disazo dye of the benzidine class; a good tissue stain, producing results similar to Ehrlich's hematoxylin. "Victoria green G," a trisazo dye of the benzidine class of direct cotton dyes; stains distinctly differently in aqueous and in alcoholic soln., and can give good double staining effects with "Hickson purple" or "Marshall red," although these dyes are essentially nuclear. "Manchester blue," a disazo direct cotton dye of the benzidine class. "Owen's blue," a dye similar in constitution to the last; a very powerful stain with considerable metachromatic effect on plant tissue. The double staining methods recommended call for 20 min. in saturated aqueous Marshall red or 10 min. in satd. aqueous Hickson purple, followed by 30-60 min. in saturated Victoria green G in 70% alcohol, with a rinse in 90% alcohol, dehydration and mounting. Either combination gives good double staining in animal tissue.—H. J. Conn (in *Stain Technol.*).

21556. DE MENT, JACK. Fluorescent chemicals and their applications. [With a special chapter on Ultraviolet Radiation Sources by H. C. DAKE.] xiii + 240p. Illus. Chemical Publishing Co., Inc.: Brooklyn, 1942.—Fluorescent light, technic, application of fluorescent chemicals, u-v. sources and filters comprise the first half of the book. The fluorescent nature of a large number of inorganic and organic compounds, and, in a separate chapter, of water completes the book. Attention is called to the importance of substances which absorb long wave-length u-v. and emit short wave-length u-v. which is destructive to living matter. NaCl excited by x-rays and water by β and γ radiation also give out a toxic fluorescence. This opens an

interesting field for exptl. biology and medicine. The author's definition of fluorescence is so broad that chemiluminescence and triboluminescence are not excluded. The descriptions of the fluorescent compounds are given mainly in terms of response to the mercury arc, which has considerable amts. of energy at certain regions of the spectrum and very little between them. It is probable that further investigation using continuous spectrum sources will necessitate revision of a number of statements such as that a given substance reacts best at 365 or at 234 m μ , which happen to be intense Hg lines.—O. W. Richards (*in Trans. Amer. Microsc. Soc.*).

21557. De MENT, JACK. (*Mineralogist Labs., Portland, Ore.*) Fluorescence spectromicroscopy. *Trans. Amer. Microsc. Soc.* 61(3): 306. 1942.—The fluorescence spectromicroscope consists of a standard microscope fitted with a spectroscopic eyepiece. Fluorescence is excited in the specimen on the stage with high-intensity u.-v. radiation from a General Electric H-4 bulb, and filtered through a Corning Glass 986 or 597. The radiation is focussed by a quartz or fluorite double-convex lens; other alterations are not needed in the lens system. Observations are made in the dark and when the instrument functions correctly only the specimen fluoresces. Its emitted light is broken up by the spectroscopic attachment and the important bands noted. Fluorescence spectromicroscopy is suggested as being of value for studies on bacteria stained with fluorochromes, hair, flakes of tissue, and so on.—Jack De Ment.

21558. GOODRICH, E. L. A new method of dissociating cells. *Quart. Jour. Microsc. Sci.* 83(2): 245-258. 1942.—This method for the dissociation of cells of the tissues of Metazoa consists in immersing small animals or small portions of tissue for a few days in a sat'd. soln. of boric acid in 0.75 soln. of NaCl in water. Just before use a few drops of Lugol's solution of iodine (2 drops in 25 ml.) should be added to the soln. of boric acid. After a suitable time (1-3 days or more) the material can be transferred to a slide, and the cells will usually come apart easily, and show little or no distortion. The method is particularly successful with epithelia (columnar, ciliated, etc.). Examples are figured from *Hydra*, *Lumbricus*, *Rana*, and *Lepus*.—E. L. Goodrich.

21559. HORSFALL, R. BRUCE Jr. (*Bausch and Lomb Optical Co.*) Measurement of numerical aperture. *Trans. Amer. Microsc. Soc.* 61(3): 297-301. 1942.—Imperfection of lens correction is shown to be the major source of ambiguity in interpretation of the definition of numerical aperture of condensers. The measurement of numerical aperture depends on the size of the source considered. Definite techniques, therefore, are proposed to take account of the size of source normally used with each type of condenser and to eliminate the cause of the ambiguity. A similar modification of the term "Aplanatic Aperture" is proposed. Acceptance of these techniques or suitable modifications of them will go far toward eliminating disagreements and misunderstandings in this field in the future.—Auth. summ.

21560. LLOYD, WILLIAM E. (*Duquesne U., Pittsburgh, Pa.*) Embryonic fixation involving the use of Cellosolve. *Proc. Pennsylvania Acad. Sci.* 15: 58-59. 1941.—Liver, kidney, testis, and intestine of an embryo rat were fixed in the following mixture for 12 hrs.: 1% picric acid in cellosolve 75ml., formalin 15ml., glacial acetic acid 10ml. They were then dehydrated in cellosolve, cleared in petroleum ether, and infiltrated by vacuum. This is described as a quick and fairly satisfactory method with compact tissues but poor for loose tissues.—F. W. Emerson.

21561. LUBKIN, VIRGINIA, and MARY CARSTEN. (*Montefiore Hosp., N. Y. C.*) Elimination of dehydration in histological technique. *Science* 95(2477): 633-634. 1942.—By use of the polyvinyl alcohols.—M. A. Raines.

21562. MEDAWAR, P. B. The rate of penetration of fixatives. *Jour. Roy. Microsc. Soc.* 61: 46-57. 1941.—Plasma is prep'd. from a cockerel by bleeding from the carotid artery, spinning the blood, and storing the supernatant plasma in waxed test-tubes on ice. For exptl. purposes it is coagulated by warming to 37°C, or by adding a trace of a tissue extract in saline, in short glass tubes of constant bore sealed at one end. These tubes are stood in stoppered vessels containing a volume of fixative at least 30 times

the volume of the plasma. The fixative is periodically renewed. For fixatives which precipitate proteins, rate of fixation is measured by the distance, at definite times, of the surface of the plasma from the boundary formed at the level where the reagent is of a conc. sufficient for precipitation. For other fixatives, special indicators are added to the plasma: for K dichromate, methylene blue; for acetic acid, brom thymol blue; for osmic acid, 1% pyrogallic acid; for formaldehyde, phenylhydrazine hydrochloride in saturated aqueous soln.; for iodine, starch soln. Temp. and the conc. of the fixative remaining constant, the distance (x) penetrated by the wave-front (boundary of precipitation) depends upon the following function of the time of fixation (t): $x = K\sqrt{t}$. K is called the coeff. of penetration. Its value was detd. for each of various simple fixatives, in the concs. in which these are used in standard fixing fluids, as well as for the combined fluids themselves. In the table of results given, K is highest for 25% acetic acid, lowest for 1% tannic acid.—C. E. Allen (*in Stain Technol.*).

21563. MILLER, LEWIS B. (*W. H. & L. D. Betz, Consulting Engineers, Phila.*) Dispersion of powders for microscopical examination. *Trans. Amer. Microsc. Soc.* 61(3): 302-305. 1 pl. 1942.—An improved method for preparing slides of fine inorganic powders for microscopic examination has been developed in which the particles are well and uniformly dispersed. A small quantity of the material to be dispersed is thoroughly rubbed into a medium, consisting of: amyl acetate 82 gm, ethyl ether 6 gm, ethyl ale. 4 gm, parlodion 2 gm. One drop of the mixture is placed on the surface of water, which causes the parlodion to form a thin film containing the fine particles uniformly dispersed. A section of the film, transferred to a clean slide, may be mounted permanently by means of a drop of clarite in toluene.—L. B. Miller.

21564. PENNY, S. F. A substitute for cover glasses in mounting pathological specimens. *Canadian Jour. Med. Techn.* 2(2): 1940.—Due to rise in price and lack of German supply, the author tried various thicknesses of cellophane, plastocele, and mica, using gum dammar as mounting medium. All proved unsatisfactory. Attempts were made to find a transparent plastic material which could be applied in liquid form, drying with a hard, smooth surface. Clear Duco was fairly satisfactory, but a new quick-drying clear lacquer has proved the best material so far. The lacquer used is C.I.L. Special Slide Lacquer XB 6965-(S.R. 2452; I.R. 23-710). Retail price, Jan. 1940, was \$7.50 per gallon, obtained from Paint and Varnish Division, Canadian Industries, Ltd. This lacquer has an advantage over Duco in that it is soluble in xylol, and may be applied to sections direct after removal from xylol. Apply the lacquer by brushing it lightly over the section and the surrounding slide with a camel-hair brush about 1.5 cm. in width. The sections are then allowed to dry at room temp. and are ready to be examined after 15 min. The lacquer surface smoothes out and brush marks disappear. It has remained clear after exposure to light for several months. Under high-power oil immersion the cell detail is slightly hazy. The mixture index was estimated to be 1.4835, and this is reputed to be the nearest index to glass of any of the quick-drying lacquers. If a high-power dry objective with compensating collar is used, the refractive error can be corrected and cell detail becomes quite clear.—Courtesy *Stain Technol.*

21565. RICHARDS, OSCAR W. The effective use and proper care of the microtome. 80p. 40 fig. Spencer Lens Co.: Buffalo, N. Y., 1942.—Directions are given for the use of sliding and rotary microtomes for cutting frozen, cellodin and paraffin imbedded material. The nature of knife sharpness is discussed and sharpening technic is given. Temperature control is considered. New methods are used to measure thickness of section and the resistance to cutting. Distortions are described together with methods for minimizing the deformation due to the cutting process. Common difficulties are arranged in a check list with recommendations for their avoidance. A bibliography of 90 titles is included. The booklet aims to cover in some detail the actual use of the microtome in section cutting, with special reference to the paraffin method.—O. W. Richards.

21566. STOWELL, R. E. (*Barnard Free Skin and Cancer Hosp., St. Louis, Mo.*) The use of tertiary butyl alcohol in microtechnique. *Science*, 96(2485): 165-166. 1942.—A mixture of 10 ml. tertiary butyl alcohol (TBA), 40 ml. of 95% ethyl alcohol and 50 ml. water can be substituted for 50% ethyl alcohol. Material can be placed in this mixture directly after washing or run through a lower series of alcohols. High percentages of TBA-ethyl alcohol solutions (TBEA) are used for subsequent dehydration up to 100% TBEA (75 ml. TBA and 25 ml. absolute ethyl alcohol). Material is then placed in pure TBA, then equal parts of TBA and paraffin oil then infiltrated with paraffin.—*M. D. Howe.*

21567. WITTLAKE, EUGENE B. (*Ohio State U.*) An efficient vacuum apparatus for microtechnic. *Ohio Jour.*

Sci. 42(2): 65-69. 1942.—Papers previously published on this subject have omitted references to the rate of increase or decrease of vacuum and the pumping of toluene and xylene in relation to water or water vapor. Satisfactory pumping schedules have been worked out; with these schedules a max. vacuum pressure of 600 mm. mercury caused no damage to plant tissues. The entire processes of fixation, dehydration and infiltration of paraffin were carried out in vacuum. With this apparatus the factors affecting plant tissues while in a vacuum are more easily controlled by the operator because of an automatic check-valve used in the pump system. Many difficulties in paraffin infiltration are thus eliminated. Most dehydration and infiltration schedules were cut to half of the normal time.—*E. B. Wittlake.*

HUMAN BIOLOGY

EARL W. COUNT, *Editor*

(See also Physical Anthropology and Entries Evolution of human and insect societies, 21423; Secular changes in death rates, 21551; Timidity in gonadectomized rats, 21581; Individual differences in ability, 21588; Alcohol and auto driving, 21747; Influence of prenatal diet on mother and child, 21780; Superior children through modern nutrition, 21787; Family nutrition, 21791; Diets of children in low income urban families, 21803; Treatment of alcoholism, 22168; Schizophrenia, 22348; Blood glycolalase in mentally ill, 22359; Diet and dental caries, 22389; Racial differences in tooth eruption time, 22395; Growth of children, 22428; Blood groups in Amer. Ind., 22587; Syphilis reactions in identical twins, 22653; Tuberculosis mortality, 22711; Syphilis incidence in Virgin Is., 22729; Community health (text book), 22736; Housing family size and overcrowding, London, 22741)

POPULATION, FERTILITY, VITAL STATISTICS

21568. GALPIN, S. L. (*Morgantown, W. Va.*) Population trends with special reference to West Virginia. *West Virginia Med. Jour.* 37(7): 306-308. 1941.

21569. TURIN, S. P. Some observations on the population of Soviet Russia at the census of January 17th, 1939. *Jour. Roy. Statistical Soc.* 104(2): 172-174. 1941.—U.S.S.R. 1939 census gives a pop., exclusive of W. Ukraine and W. White Russia, of 170,467,186—15.9% increase over 1926. Urban pop. doubled; rural declined through emigration. Tables break down the pop. by social gps., age grades, % literacy in rural and urban pops., national comp. according to each republic.—*W. D. Baten.*

21570. VANCE, RUPERT V. (*U. N. Carolina.*) The regional approach to the study of high fertility. *Milbank Memorial Fund Quart.* 19(4): 356-374. 1941.—If all factors affecting fertility were the same in the Southeast as in the whole nation there would have been 82,760 fewer births in that region in 1930 than actually occurred. After allowing for different race distribution, rural-urban residence and age factors it is calculated that an excess of 47,691 births or over one-half of the region's excess fertility is due to greater age-specific fertility. Part of this is due to economic causes and part to a difference in cultural viewpoints.—*E. K. Kline.*

21571. ANONYMOUS. Registration of the United Kingdom. *Jour. Roy. Statistical Soc.* 104(2): 204-208. 1941.—5 tables cover England, and Wales, Scotland, Northern Ireland, Eire, Great Britain and Ireland; recording, per year, 1937-1940 incl., the pop., birth, death, marriage, infant mortality statistics.—*W. D. Baten.*

ALCOHOLISM, DRUG ADDICTION

21572. CARLSON, ANTON J. (*U. Chicago.*) The alcohol problem: possible lines of useful research. *Quart. Jour. Stud. Alcohol* 2(4): 672-676. 1942.

21573. JELLINEK, E. M. (*Yale U.*) An outline of basic policies for a research program on problems of alcohol. *Quart. Jour. Stud. Alcohol* 3(1): 103-124. 1942.

21574. LEMERE, F., W. L. VOEGTLIN, W. R. BROZ, and P. O'HALLORAN. Conditioned reflex treatment of chronic alcoholism; V, type of patient suitable for this treatment. *Northwest. Med.* 41: 88-89. 1942.—Of 1,042 alcohol addicts treated by the conditioned reflex method from 6 months to 5½ years ago, 830 were contacted and of these 58.7% were found to be still abstinent. It is believed that this % can be improved by a careful selection of the type of patients suitable for this method of treatment. The following types are considered as unpromising: 1. The financially indigent; those who pay for their treatment are usually more responsible people and the factor

of cost is an additional restraint against relapse. 2. The uncooperative; only patients who come voluntarily should be accepted. 3. The constitutional psychopath; borderline mental cases are very poor candidates and the fact that a few have been cured should be considered "a miracle." 4. The inadequate; the immature, sensitive, easily led, who drink as an escape, may be treated, but should be followed for a long period after treatment if relapse is to be prevented. 5. The deteriorated; patients badly deteriorated from alcohol and vitamin deficiency should never be treated. 6. The psychotic; entirely unsuitable for this treatment. 7. Women; in women, drinking represents a more serious break with normalcy and their cure is twice as hard as that of men. 8. Others; professional men, especially doctors, business executives, bankers, musicians and artists, are very hard to cure, and the reasons for this are not clear. Very few of the patients treated were considered truly neurotic. It is felt that many of the patients would benefit by psychotherapy but only after a successful treatment. The type best suited for the conditioned reflex treatment is the normal, stable person who has gradually developed the habit and now wants help in breaking from it. It is urged that treatment of hopeless cases should not be undertaken because, by this, the method is discredited and valuable psychologic force is sacrificed.—*Courtesy Quart. Jour. Stud. Alcohol.*

21575. ANONYMOUS. The research council on problems of alcohol. *Science* 95: 217-218. 1942.—An outline is given of the researches now in progress under sponsorship of the Research Council on Problems of Alcohol.—*Courtesy Quart. Jour. Stud. Alcohol.*

MISCELLANEOUS

21576. FRANK, LAWRENCE K. Adolescence and public health. *Amer. Jour. Publ. Health* 31(11): 1143-1150. 1941.—Demographic and mortality data during the 2d decade of life, the growth, development and maturation of the adolescent, the prepubertal period, the normal standards, nutritional status, the emotional reactions of the adolescent, problem of sex education, and the problem of delinquency are considered in detail. There is a growing realization coming from various investigations and intensive study that health and sanity can be achieved only by meeting the demands and tasks of life with vitality and courage. This appears very clearly in the life of adolescents, and therefore makes the 2d decade an important period for preventive medicine in mental hygiene provided we can devise programs adequate to the needs and requirements of adolescence.—*Henry Welch.*

21577. FURBAY, JOHN HARVEY. (*Mills Coll., Calif.*)

fornia.) Workbook manual for marriage and the family. vii + 247p. D. Appleton-Century Co., Inc.: New York, 1942. Pr. \$1.50.—The title describes the volume. It covers topically all the aspects of marriage and family by means of selected bibliography, spacings for lecture notes, for notes on suggested discussion questions and collateral reading.—E. W. Count.

21578. NEEDHAM, JAMES G. About ourselves. A survey of human nature from the zoological viewpoint. xi + 276p. Illus. Jacques Cattell Press: Lancaster, 1941. Pr. \$3.—Part I discusses man zoologically—his phylogeny, ontogeny and heredity—all from the comparative point of view; Part II deals with biol. aspects of society—problems of population, social behavior, the rôle of instinct in society, folkways, and, finally, war, government and religion as they are expressions of biol. phenomena. Here, Needham suggests that human society has the following pyramid of 4 components each successively dependent upon its precursor: (1) physiol. activities "common to all having like parts" and "serving for upkeep of the physical body"; (2) instinct, "common to all members of a species" and "serving for upkeep of the species"; (3) folkways, behavior determined by the social environment, serving for the upkeep of the group and common to all members of that group, and, finally, reason or choice, "behavior peculiar to the individual" and comprising the "range of personal freedom." Needham develops each of the phases in clear prose and shows quite well many of their intercorrelations.—*From review by Thos. Park in Ecology.*

21579. ROE, ANNE, and DAVID SHAKOW. Intelligence

in mental disorder. *Ann. New York Acad. Sci.* 42(4): 361-490. 1942.—The Stanford-Binet (1916) test was given to 827 patients at the Worcester State Hospital from 1929-33. Most of the major types of insanity were represented. Excluding non-cooperative patients, whose scores were always lower than cooperative ones, the following types showed significant lowering of the total score, the most nearly normal being given first: chronic alcoholism with psychosis, unclassified dementia praecox, general paresis, hebephrenic dementia praecox, and feeble-mindedness. Other types showed little or no lowering of score. The individual tests involving conceptual thinking and immediate learning were affected the most by psychoses, those of old learning the least.—J. P. Scott.

21580. WOODWORTH, R. S. (Columbia U.) Heredity and environment. A critical survey of recently published material on twins and foster children. *Social Sci. Res. Coun. Bull.* 47. x + 95p. 1941. Pr. \$90.—An appraisal of recent studies of foster children, including studies of twins reared apart, prepared at the request of the Committee of Social Adjustment of the Social Science Research Council. The object was to evaluate heredity and environmental factors in intelligence and achievement, to provide the committee with a record of tested research procedure, and to indicate the future investigations most needed at the present time. The author indicates that it is desirable for the social investigator and the geneticist to cooperate and he suggests that certain specific problems dealing with twins, foster children and orphanages be investigated.—Conway Zirkle.

ANIMAL BEHAVIOR

(See also Entries Evolution of human and insect societies, 21423; Habits, instincts and reflexes, 21427; Broodiness in stickleback, 21541; Ants (*Pheidole*), 21605; Home range of cottontail rabbit, 21656; Hunger due to brain lesions, man, 22368; Grazing habits of dairy cattle, 22476; Response of insects to light of diff. wave-lengths, 23194; Circling in *Gyrinus* (water beetle), 23338; Tarpon, 23362; Activity of lizard, 23375; Lyrebird, 23391; Ecology and habits of European Cuckoo and Cowbird, 23392; Bathing habits of canaries, 23396; Birds, 23415; Breeding activities of magpies, 23417; Bats, 23426)

21581. ANDERSON, E. E. Sex differences in timidity in normal and gonadectomized rats. *Jour. Genetic Psychol.* 59: 139-153. 1941.—42 normal ♂ and 40 normal ♀ rats were compared with 42 castrated ♂♂ and 43 ovariectomized ♀♀ in 4 tests of timidity: (1) open field defecation, (2) water wading defecation, (3) emergence from living cage, and (4) emergence from U-shaped stovepipe (gonadectomized animals only). Females uniformly made lower (timidity) scores than ♂♂, and this difference was uninfluenced by prepubertal gonadectomy. Several possible interpretations of the data are discussed, and it is concluded that a true sex difference in timidity is represented.—D. K. Spelt (courtesy *Psychol. Abst.*).

21582. DAVID, KARL. (Jena.) Intelligenzversuche am Eichhörnchen. *Zeitschr. Tierpsychol.* 4(1): 162-164. 1940.—This is an observational and experimental study of a pair of captive squirrels, hand-raised by the author. At the age of 13-14 wks. mating behavior was observed and the use of a "mating call" is reported. In a later study the animals were trained to pull sticks and carrots into the cage by means of strings attached to the objects. In one study carrots were placed 120 cm. distant from the cage and in $\frac{1}{2}$ of the trials the carrots were drawn into the cage and eaten. Later, a carrot was suspended by a string from the roof of the cage out of reach of the animals. The squirrels gnawed through the suspension cord; carrot then dropped to cage floor and was eaten. Next, when the suspended carrot was replaced by a crayfish no attempt was made to gnaw through the suspension cord. The author believes this selection to be a higher process response.—H. G. Birch.

21583. HALL, CALVIN S., and LEONARD L. KLEIN. (Western Reserve U.) Emotional behavior in the rat. VI. The relationship between persistence and emotionality. *Jour. Comp. Psychol.* 32(3): 503-506. 1941.—36 adult ♂ and ♀ rats taken from the 7th and 8th generations of 2 strains, one selectively bred for timidity, the other selectively bred for fearlessness, were measured for persistence using the paper barrier test. No differences between the 2 strains were found. Persistence and emotionality (timidity)

are not related temperamental traits. The paper barrier test was shown to possess high reliability.—C. W. Brown.

21584. HALL, C. S., and J. K. SHERWIN. (Western Reserve U.) Individual differences in aggressiveness in rats. *Jour. Comp. Psychol.* 33(3): 371-383. 1942.—The present expt. constitutes observations of the aggressive behavior of rats when placed together in pairs under various conditions. Three groups of 10 animals each were employed, and in each group each animal was paired twice with each other animal under each of the conditions observed for that group. The aggressiveness of each member of the pair was rated on a 7-point rating scale for each 5-min. observation period. Conditions of observation were: 1) normal—no change in animals' schedule, food and water available at all times; 2) Thirsty—animals deprived of water for about 21 hrs. before pairing, no water available in the observation cage. 3) Water—immediately after observation under condition 2, animals were placed together in small cage with single water-spout so that only 1 animal could drink at a time. 4) Post-sex—after caging the ♂♂ with ♀♀ for 10 days, they were isolated for 5 days and again paired.—The authors conclude that "the findings . . . support . . . the hypothesis that aggressiveness is a basic inborn temperamental trait or disposition."—R. F. Jarrett.

21585. RIESS, BERNARD F., and RICHARD J. BLOCK. (Hunter Coll., N. Y. C.) The effect of amino acid deficiency on the behavior of the white rat. I. Lysine and cystine deficiency. *Jour. Psychol.* 14: 101-113. 1942.—White rats were deprived of lysine, one of the essential amino acids, for 30 days following the 1st month of life. They were then run in 2 types of mazes, an activity wheel and an obstruction apparatus. Comparison with litter mates fed on a standard diet showed that impairment in learning occurred as a result of the deficiency diet. No impairment in general activity or motivation was evidenced. The same general results were found to hold for rats deprived of cystine. Impairment in both the lysine and cystine deficient animals was greater in the learning of the elevated maze than in that of the tunnel maze. From these facts

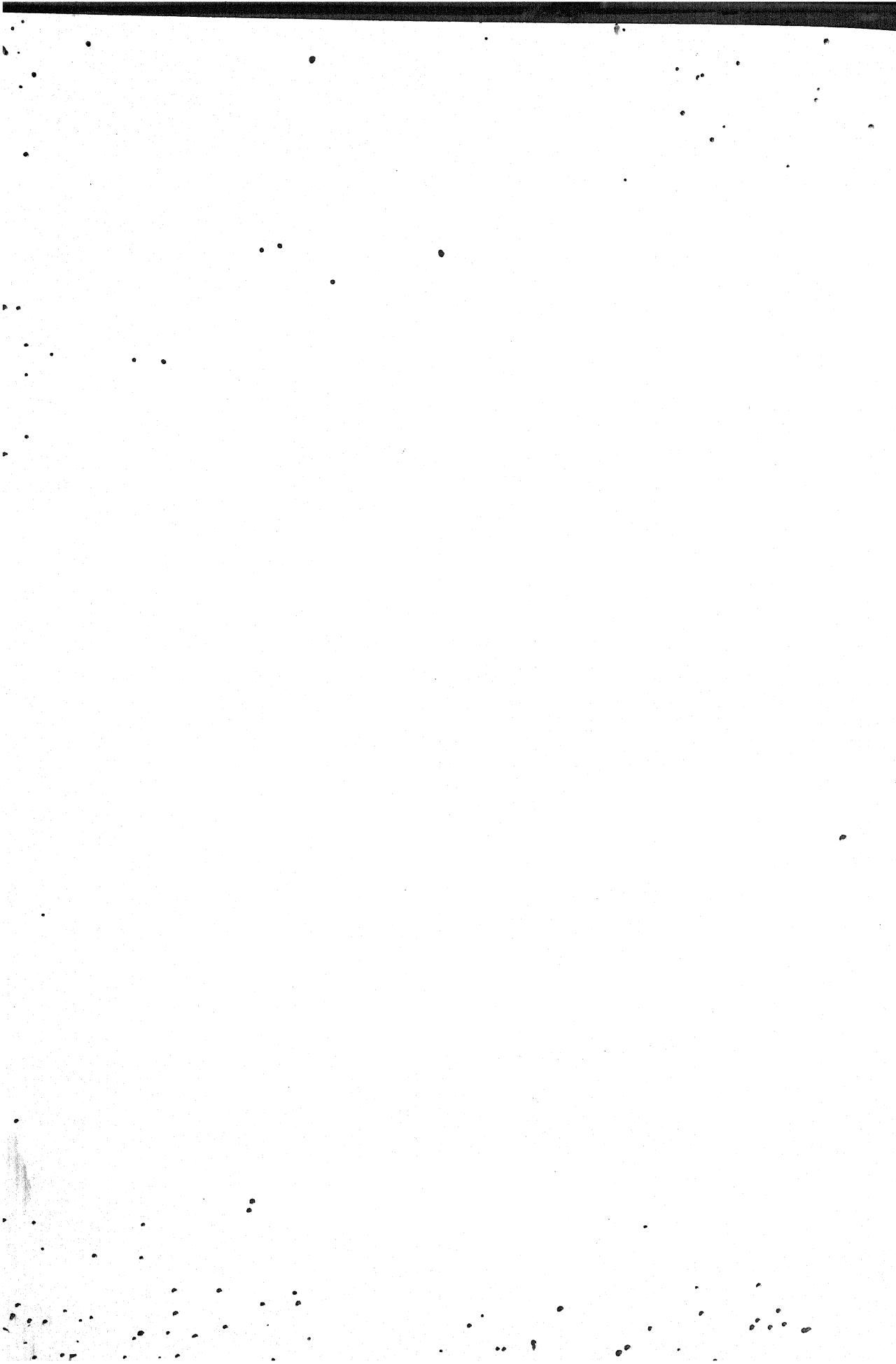
and from the absence of impairment in activity and motivation; it is concluded that lysine and cystine deficiency affects the organism centrally.—*B. von Haller Gilmer.*

21586. SAMPSON, B. H., and T. C. SCHNEIRLA. (Washington Square Coll., New York U.) The appearance of nail-biting in a rat; a fixation in a frustrating problem situation. *Jour. Comp. Psychol.* 32(3): 437-442. 1941.—A nail biting reaction is described as it developed in an adult ♂ rat during the presentation of a series of visual discrimination problems. A 2-choice Lashley jumping technique was used with an air blast to coerce the animals to choose. As the problem became more difficult, i.e., as the brightness values of the 2 stimuli approached each other, the animal's period of resistance to jumping and the frequency of occurrence of the nail-biting pattern both increased. Despite this, the animal made very few errors. No indication of nail biting was found in the living-cage situation or when the animal was subjected to the sound of a blast of air. It is held that the increasingly difficult problem and the effect of the air blast comprise the conditions effective for producing this behavior pattern.—*Harold Kelley.*

21587. STAINBROOK, EDWARD J. (Duke U.) A note on induced convulsions in the rat. *Jour. Psychol.* 13(2): 337-342. 1942.—A convulsive reaction in the rat resembling that typically seen as a resultant of a noise-fright induction can be produced by electrical stimulation of the brain. This indicates that such an electrical stimulus can produce sequences of reaction similar to those responses which other investigators have stated could be produced only by high-frequency sound. These electrically induced convulsive sequences which are similar to the ordinary noise-fright reactions are distinctly different from the pattern of the generalized convulsion which can be produced in all our animals by sufficient electrical stimulation. The rat may exhibit different reactions to different intensities of electrical stimulation applied to the central nervous system. —*B. von Haller Gilmer.*

21588. TRYON, ROBERT C., CAROLINE M. TRYON, and GEORGE KUZNETS. (U. California.) Studies in individual differences in maze ability. IX. Ratings of hiding, avoidance, escape and vocalization responses. X. Ratings and other measures of initial emotional responses of rats to novel inanimate objects. *Jour. Comp. Psychol.* 32(3):

407-435. 2 fig.; 447-473. 1 fig. 1941.—IX. The aim of these experiments was to develop objective and reliable ratings of the complex emotional responses of rats. As the result of an extensive period of trial ratings on 120 rats a situation was standardized in which 177 ♂♂ and 179 ♀♀ were rated for their hiding, avoidance, escape, and vocalization responses to handling. Very good agreement between the 3 different raters was obtained. These findings prove the existence of wide, observable differences between rats in these various types of emotional responses. Although the rats showed considerable day-to-day variability in a single observation of each type of response, the reliabilities of mean ratings based on 4 observations of each type of response were of the order 0.8. The emotions of the ♂ rats seemed to be differently organized from those of the ♀. In ♂♂, hiding seems to be a unique response, avoidance and escape are closely similar, and vocalization and defecation seem to be mildly related to the other responses. In ♀♀, hiding, avoidance, and escape seem to be determined by some common general components, yet each has some uniqueness elicited by the particular situation in which it appears, and vocalization and defecation appear to be rather highly related to the other types of responses.—X. The authors developed rating scales for the responses of a sample group of rats to apparatus features in a preliminary practice path of a maze. Rating scales were developed of the animals' reactions to free spaces or open alleys, to doors and to curtains. In addition the escape response of the rats at the time they were introduced into the practice path was rated and a measure of starting or "tub time," and one of time spent in the practice paths were obtained. The raters' agreement on the mean rating per rat covering 7 observation trials for each type of response was nearly perfect. The rat's consistency in each type of response, as determined from the correlation between split measures of each type of response ranged from 0.75 to 0.95, being higher for the ratings than for the time measures. The interrelations between these emotional measures, and between them and the previous measures of responses to handling, were studied. The organization of all of these emotional indices was found to be complex. In general, the responses elicited in a given situation tended to be highly related, but those in different situations were relatively independent.—*C. W. Brown.*



ECOLOGY

Editors

ORLANDO PARK, *General Animal Ecology*
 G. D. FULLER, *General Plant Ecology*
 CHANCEY JUDAY, *Hydrobiology (Oceanography, Limnology)*

FREDERICK A. DAVIDSON, *Ecology of Wildlife Management—Aquatic*
 ROBERT G. STONE, *Bioclimatology, Biometeorology*

(Other entries in this issue: [GENERAL AND ANIMAL ECOLOGY]—Evolution of human and insect societies, 21423; Lethal temps. to Canadian fishes, 21645; Accumulation and discharge of sperm by oysters at diff. depths, 21647; Relation of man and animals to environment: physiology of food-use, 21779; Native Australian insects that have become pests, 23188; Cold weather effects on insects, 23193; Seasonal distr. of wireworms in soil, 23196; Alfalfa snout beetle, 23197; Sampling Anopheles larvae population, 23230; Anopheles larvae and surface tension of water, 23235; Symbiosis, 23282; Zoogeography of Pacific snails, 23234, of African mosquitoes, 23340; Sexual cycle of shipworm, 23326; Tadpoles as hosts of glochidia of fresh-water mussel, 23328; Oxygen economy of aquatic insect, 23333; Circling in Gyris (water beetle), 23338; Mexican Anopheles, 23349; Ant communities, 23353, 23355; Ant-hill ventilation, 23356; Ant populations and climate, N. Dakota, 23359; Anura, 23371; Activity of lizard, 23375; Turtles, 23377; Ecology and habits of European cuckoo and cowbird, 23392; Adaptations in mocking-birds, 23397, for different modes of locomotion, birds, 23404; Birds of Siwa Oasis, 23409; Guano-producing birds, 23422; Bats, 23431; Cave bats, 23435. [PLANT ECOLOGY]—Vegetation as object of study, 21422; Growth ring and climate, 21594; Coliform bacteria, 22734; Molds, 22784; Photography of Red Sea algae, 22882; Soil algae (Scytonema), 22884; Spore dispersal in molds, 22886; Dispersal of fungous spores, 22887; Termitophile agarics, 22891; Intertidal lichens, 22904; Adaptation of Funaria (moss) to unfavorable conditions, 22905; Liverwort flora of unglaciated areas, Iowa, 22906; Bryophyte flora of Rumania, 22907, 22908; Photogeogr. of Tasmanian and N. Zealand mosses, 22909, of Ranunculus, 22927; Mosses and Pleistocene climates, 22910; Antarctica as source of existing ferns, 22913; Fern gametophytes, 22914; Floristics of Indo China, 22916; Panama, 22939; Microcycas, 22943; Grazing as affecting Nebraska range land, 22954; Clipping vs. grazing as affecting bot. composition of pastures, 22959; Ecol. adaptations in winter wheat, 22960; Turf establishment on airfields (etc.), 22962; Selenium indicator plants, 22963, 23100; Soluble Se in soils of north-central U. S., 22965; Ecology of field crops, 22966; Erosion and land-use, Penna., 22970; Blue-grass and non-symbiotic N fixation, 22977; Soils of Oklahoma, 22981; Soil survey data on maps, 22983; Characteristics of the great soil groups, 22984; Soil moisture and conserv. practices, 22985; Rainfall runoff, 22986; Ca in soils, 22988; Soil genesis, 22994; Introduction of pine into N. Zealand, 23033; Conifer growth on mull and mor, 23036; Forest-site factors and yields, 23040; Pine in Scotland, 23044; Laysan I. (near Midway), 23386)

GENERAL

21589. BEECHER, WILLIAM J. Nesting birds and the vegetation substrate. 69p. Frontispiece, 2 maps, Chicago Ornithological Society: Chicago, 1942. Pr. \$1.—This paper brings together studies of plant ecology and bird populations made in a 482-acre upland-marsh area near Fox Lake, Illinois. The studies were carried on from 1935 through 1939. Methods used in the studies, particularly in obtaining the basic data (over 1200 nests) are reviewed in detail. The development of the seral levels in the marsh associates, with some indication of ancient origin and relatively constant character as to plant communities, is outlined briefly. The present plant communities are then considered in the order of succession with notes as to the relative importance of each community for nesting and the adaptations to the life-form of the dominants as seen in nest construction. A brief quantitative summary of population data covering the densities of each sp. in all the plant communities is presented with intent to emphasize the relative importance of plant communities. Correction of the basic data on densities in terms of edge is undertaken. There is found to be a positive correlation between feet of edge and number of nests, thus showing that population density increases directly with increase in number of feet of edge per unit area of the plant society or with the increasing floristic complexity of the environment in terms of communities per unit area. The distribution of nests in terms of Raunkaier's Law of Frequency is examined but the general unsatisfactory nature of the results is undoubtedly due to the fact that Raunkaier's Law operates effectively

only when the quadrats are of the proper size. Frequency curves of the non-Raunkaier type based on number of nests and plant communities per quarter-acre quadrat serve merely to further accentuate the fact that the frequency of nests depends on the frequency of communities per unit area. Quantitative data covering the breeding period of each species show that those spp. which nest earliest are the ones notably independent of vegetation while those that nest in the middle of May are dependent on the condition of the vegetation. Similar data on the vertical distribution of nesting

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special reference to the green algae found within the egg envelopes. *Ecology* 23(2): 215-227. 2 pl., 1 fig. 1942.—The green color observed commonly in *A. maculatum* egg masses at late stages of development is due to the presence of

21590. GILBERT, PERRY W.

(Cornell U.) Observations on the eggs of *Ambystoma maculatum* with es-

unicellular green algae which flourish in the egg envelopes. The algae, as yet undescribed but probably closely allied to the genus *Chlorochytrium*, are found in all 3 egg envelopes of *A. maculatum*, being most numerous in the inner and least abundant in the outer egg envelope. The algal cells at different stages in their life cycle may be spheroidal or ovoid in shape, motile or non-motile, and motile stages may possess 2 or 4 flagellae. The largest cells are of the spheroidal non-motile type and measure 25 μ to 30 μ diam. The algae enter the egg envelopes from the water after the eggs have been deposited. Eggs deposited in algae-free water do not harbor the algae. Evidence at hand suggests the possibility that the relationship between algae and developing egg is a symbiotic one. The association of unicellular green algae with the eggs of *A. maculatum* is neither an occasional nor a local one for all the egg masses of this salamander observed in central New York, with one exception, have been found to harbor the algae. All the egg masses from Michigan and New Hampshire which have been examined have likewise been inhabited by the same unicellular green algae.—P. W. Gilbert.

21591. KENDEIGH, S. CHARLES. (U. Illinois.) Research areas in the National Parks, January 1942. *Ecology* 23(2): 236-238. 1942.—The Committee for the Study of Plant and Animal Communities of the Ecol. Soc. of America lists and briefly describes 28 research areas in 10 National Parks. These research areas are portions of parks not easily accessible to the general public and where disturbance by man is at a minimum. They represent primitive plant and animal communities or communities that have changed through natural causes. No fish culture is permitted in these areas. Control of the areas is under the superintendents of the respective parks.—S. C. Kendeigh.

BIOCLIMATOLOGY, BIOMETEOROLOGY

(Other entries in this issue: World map, 21451; Temp., and mutation in plant, 21518, effects on ECG of hypophysectomized toads, 22114, humidity and commercial storage of fruit, 23025; Temp./humidity effect on Saturniid moths, 21607; Humidity and lichenes, 21616; Dendrochronology, Arkansas, 21624; Climate of ponds, Germany, 21640; Sunlight and antirachitic potency of butter, 21681; Seasonal effects on plasma proteins, 21760, on Vit. A content of livers in sheep, cattle and pigs, 21866; Response of adrenal cortex to low atm. pressure, 21991; Influence of temp. on ECG of normal toads, 22113; Dietary deficiencies during winter months, in children, 22265; Seasonal variation in semen quality, bull, 22464; Climatic factors and milk production in Argentina, 22483; Winter sunshine and duration of pregnancy, guinea pig, 22507; Rel. hum. and air sterilization with aerosols, 22738, and molds, 22784; Snow algae of Alaska, 22879; Light intensity in submarine grottos, and algae growth, 22880; Mosses and Pleistocene climates, 22910; Potato raising in Australia, 22952; Weather factors affecting growth of sugar cane, 22953; Weather and nitrogen nutrition of sugar cane, 22957, and wheat yields, N. Dakota, 22976; Ecol. classification of climates, 22966; Soil moisture and conserv. practices, 22985; Soil genesis, 22994; Movement and evap. of soil water, 22998; Russeting of apples, 23000; Irrigation water requirements of Citrus, 23009; Sugar content of grapes as indicator of climatic conditions, 23011; Frost protection in Avocado orchards, 23027; Cold weather effects on insects, 23193; Rainfall and spray-residue on apples, 23210, and gall midge damage, West Indies, 23339; Pleistocene climates, 23253; Ant populations and climate, N. Dakota, 23359; Activity of lizard, 23375; Bird populations on Guano Islands, 23422; Post-glacial climatic amelioration, 23425)

21592. CONRAD, V. (Harvard U.) Fundamentals of physical climatology. vii+121p. 16 maps, 8 fig. Harvard University Press: Cambridge, 1942. Pr. \$1.25.—A novel treatment of climatology in an introductory work; the author describes only those basic phenomena that can be interpreted by a few well-established physical principles. The physics used is described incidentally as necessary, but the treatment is elementary enough for those who command

simple algebra and high-school physics. The result is a series of essays that emphasize how the approach to climatic (average) atmospheric conditions can be made rational. This is a welcome effort in view of the overly empirical character of most climatic treatises. The topics covered are: radiation balance of the atmosphere, air temp. at the earth's surface, lapse rate, static and dynamic inversions, continental and ocean climate, local and world-wide circulations, meridional heat exchange, humidity; clouds, sunshine and fog, rain, synthetic climatology. There are 60 interesting diagrams and maps.—R. G. Stone.

21593. DAVIS, FLOYD E., and GEORGE D. HARRELL. Relation of weather and its distribution to corn yields. U. S. Dept. Agric. Tech. Bull. 806. 1-67. 1942.—Max. temps. on the average are too high for corn under the moisture conditions encountered at Manhattan, Kans., Lincoln, Nebr., Columbia, Mo., Urbana, Ill., Wooster, Ohio, State College, Pa., and College Park, Md. The effect of maximum temps. above av. is more pronounced at locations having the highest average seasonal temp. Max. temps. above average in both July and Aug. are detrimental to corn from one extreme of the Corn Belt to the other, while with the exception of Urbana, Ill., above-average temps. in May are beneficial to corn. Of the 2 weather factors, max. temp. seems to be the more dominant in its effect upon corn yields. At least part of the beneficial effect of additional rainfall is due to the associated effects of the accompanying lower temp. Optima for max. temp. for corn grown under the field conditions represented at the locations studied in this paper range from 77° F at Lincoln, Nebr., to 85° at Columbia, Mo. Although these optima are apparently related to the amt. of early-season rainfall, some differences are expected between locations because of fluctuations in the curve due to sampling error. Comparison of the effect of the amt. and distribution of rainfall on the same var. of corn grown under divergent cultural conditions at Wooster, Ohio, indicates that the effect differs markedly between high- and low-yielding series. Because of this fact and due to differences in practices at the several stations studied, differences in curves in the different States cannot be ascribed entirely to location and the rainfall identified with such location. Av. rainfall appears sufficient for corn in Iowa, the heart of the Corn Belt, probably because of the water-storing capacity of the soil. When the results for Md., Penna., and Iowa, which were not significant, were omitted, the rainfall regression formula alone accounted for a portion of the total variance of yield ranging from 22% at Wooster to 66% at Manhattan. The temp. regression formula alone accounted for a portion of the total variance of yield ranging from 24% at Penna. to 81% at Manhattan, Kans. The seasonal distribution of the factors of rainfall and max. temp. was found to be important at most of the locations studied. Continuous curves were obtained that show for any time during the season the av. effect of deviations of rainfall and max. temp. from the normal for that period. The curves obtained facilitate biol. interpretations of weather-yield relationships as within a season and as between locations. They also appear superior to ordinary regression expressions. Weather data collected through the entire growing season can be utilized.—Auth. conc.

21594. GLOCK, W. S. Growth rings and climate. *Bot. Rev.* 7: 649-713. 1941.—A review of 203 titles which include, roughly, one group chiefly interpretation and another fundamental botanical research. The review especially considers recent emphasis on correspondence between rainfall, or rainfall and temp., and growth-rings, and the methods used. A summary of a new type of correlation coeff. is given. It is concluded that fundamental botanical knowledge is necessary to continuation of interpretation, that present statistical correlations offer little basis for derivation of past, or prediction of, future climate, and that new criteria must be worked out on strictly botanical and ecological bases.—W. S. Glock.

21595. POWELL, PHILIP J. (U. S. Weather Bur., Lakeland, Fla.) Further study in relationship between fruit and air temperatures. *Bull. Amer. Meteorol. Soc.* 23(1): 16-21. 1942.—The following points are important in the proper heating of orange groves in Florida to protect the

fruit against low temps.: (1) With a fast drop of the air temp., the fruit temp. tends to parallel it closely. With slowly falling or stationary air temp., the fruit temp. drops lower than the air temperature, except occasionally when freezing of the fruit has already begun. On dry nights, exposed oranges tend to maintain a temp. as much as 3° or more lower than a stationary or slowly falling air temp. On nights when dew and frost form on the fruit, this temp. difference is usually reduced to from 1° - 2° . The factors believed responsible for this radically different characteristic of Florida oranges, as compared with California oranges, are the thinner rind and the greater amt. of moisture in the rind of the Florida orange; both these properties cause a faster rate of cooling by allowing more rapid conduction of heat from within the orange to the surface than does the thicker, drier skin of the California orange. (2) The proper use of fruit thermometers provides the best temperature index in scientific grove heating. On nights of dry cold, unshielded fruit thermometer readings are representative of true grove conditions. From exptl. data, however, it appears that to obtain reliable records on nights when the dew point temp. is high and frost forms, the puncture in the fruit made by the thermometer must be sealed with petroleum jelly, or some other suitable substance, to prevent the frost particles from coming in contact with the fruit juice at this point; otherwise, premature crystallization in the fruit will occur.—From auth. summ.

21596. SCHULMAN, EDMUND. (U. Arizona.) Centuries-long tree indices of precipitation in the southwest. I. *Bull. Amer. Meteorol. Soc.* 23(4): 148-161, (5): 204-217, 17 figs, map. 1942.—Tree-ring series, if they are proved to be climatic records, have much potential value because of great length, particular mountainous site, and centuries-long homogeneity. Significant dendrochronological work must recognize the importance of selection of specimens and crossdating of records. Douglas fir, distributed in patches over one-half million square miles of the Rocky Mts., has been found to be one of the best recorders of precipitation; Douglas fir and ponderosa pine form the basis of the present study. Synchronous fluctuation in annual growth is illustrated in many Southwestern selected trees. Curves of mean annual growth are given for 5 areas from southern Arizona to Mesa Verde, Colorado; these vary in length from 300 to 560 yrs. Curves of growth represent to a marked degree the recorded year-to-year fluctuations in winter (Oct.-June) precipitation for 5 representative areas of the Southwest: Tucson, Chiricahua Mts., Gila River headwaters, Kaibab Plateau, and Mesa Verde. The precipitation spectrum of wet and dry yrs. is apparently nearly identical at nearby, high- and low-level stations. In the Southwest, trees under the climatic stress of precipitation deficit (soil moisture) may disagree in ring chronology with others only a few yards distant but not under climatic stress, yet may closely parallel trees on difficult sites 400 miles away. A 55-yr. "controlled experiment": an example from Monterey, California, which shows the effects on 2 old pines of irrigation, 1880-1935, in destroying their crossdatability and value as precipitation records. Summer precipitation in the Southwest, roughly 50% of the annual total, has little influence, in general, on variations in ring thickness in Douglas fir and ponderosa pine. No general effects of annual temp. variations are found in the ring records. Tree growth in the Gila River headwaters area provides a centuries-long and closely approximate index of run-off. Comparisons of chronologies across 400 miles north-south and 250 miles east-west emphasize that even in regions of generally similar climate there is a changing areal domain under the influence of drought in different yrs., a persistent feature of the 3 centuries of data. A method is suggested for quantitatively delineating a homogeneous dendrochronologic area, interpretable as a climatic unit. With the frequently violent fluctuations in successive yrs. smoothed out, the av. duration of excess (wet) or deficient (dry) growth in the Southwest is about 8 or 9 years, on the basis of the last 3 centuries of data; intervals substantially more than twice this are infrequent. Since 1640 in the southern Southwest about 4% of the years are characterized by extreme winter

droughts with growth < half of normal, and about 15% of the yrs. show growth < $\frac{1}{4}$ of normal; the significant percentages are somewhat greater in the Mesa Verde area. In some areas the absence and in other areas the presence of the sun-spot cycle in tree growth leads to a suggestion of a possible relation to climatic latitude.—From auth. summ.

21597. TRUMBLE, H. C. Climatic factors in relation to the agricultural regions of southern Australia. *Trans. Roy. Soc. S. Australia* 63(1): 36-43. Illus. 1939.—Agro-climatic zones of southern Australia are shown as based on the mean monthly temp. of the 3 winter months and the period of "influential rainfall," defined as the time-interval over which the upper 4 inches of soil was maintained above the wilting point of herbage plants—equivalent approx. to the period over which rainfall exceeded $\frac{1}{3}$ of the monthly evaporation from a free water surface. A tentative outer limit to successful wheat culture is set at the 5-months isochrone for influential rainfall; the limit to the development of European and New Zealand pasture mixtures and methods of husbandry is indicated by the 9-month isochrone. Variability is yet to be investigated.—J. K. Rose.

21598. VARIOUS AUTHORS. Proceedings of the Hydrology Conference, June 30-July 2, 1941, State College, Penn. *Pennsylvania State Coll. Sch. Engineer. Tech. Bull.* 27. 1-270. 1941.—The Proceedings contains 16 of the papers, with discussions, presented at the conference held at the Pennsylvania State College under the joint auspices of the Section of Hydrology of the American Geophysical Union, the Soc. for the Promotion of Engineering Education, the Committee on Hydrology of the Amer. Soc. of Civil Engineers, and the Penna. State College. The papers in order of publication are as follows: Application of Hydrology in Flood Control, by Gail A. Hathaway. Contains a brief review of the status and growth of flood control in the U. S.; describes the method of analysis of storm data and presents various methods used by the U. S. Engineer Office in applying hydrologic data to flood problems.—The Relation of Hydrology to the Third Locks of the Panama Canal, by H. W. BROD. Presents a brief résumé of the history of hydrology in the Panama Canal Zone. Gives a brief outline of the procedure utilized in solving problems in connection with the Third Locks project requiring hydrologic analysis.—An Outline of the Runoff Cycle, by W. G. HOYT. Considers 5 phases, each related to the rainfall characteristics, in relation to precipitation, water-loss and surface runoff.—Development of Climatological Records of the United States, by MERRILL BERNARD. Gives chronological data as to development of the climatological network in the U. S.; also a brief résumé of the present-day climatological network.—Some Aspects of Sub-surface Water in Hydrologic Research on Agricultural Watersheds, by H. S. RIESBOL. Presents a thorough and comprehensive analysis of certain aspects of subsurface water as related to water conservation and runoff control on agricultural watersheds in the vicinity of Coshocton, Ohio.—Looking Ahead at the Weather, by W. F. McDONALD. A general discussion of weather forecasting and the need for more accurate forecasts, giving an outline of what the Weather Bureau is doing to accomplish such results.—Some Aspects of Infiltration in Relation to Runoff, by F. W. MUSGRAVE. Lists the general processes and factors which influence infiltration on small areas. The method of computing infiltration on the Saluda River basin is discussed by A. L. COCHRAN.—The Application of Our Knowledge of the Organic Layers of the Soil Profile to Flood Control, by H. F. MOREY. Considers the effect of humus on flood control and gives the results of such studies in the Connecticut River valley.—The Melting Characteristics of Snow and its Contribution to Runoff, by WALTER T. WILSON. Presents the basic facts regarding the melting of snow and its effects on runoff.—Application of Hydrology to Soil and Water Conservation, by C. E. RAMSER. Describes the functions of each section of the Hydrology Division of the Soil Conservation Service. Gives a list of hydrologic and hydraulic problems in which the Division is interested.—The Measurement of Evaporation and Transpiration from Natural

Surfaces, by C. W. THORNTWHAITE. This paper is a summary of a more complete report by Thornthwaite and Holzman on the measurement of evaporation. Briefly reviews the progress made in measuring evaporation and condensation and gives the results for the year 1938 of the measurement of precipitation, condensation and evaporation at the Experiment Station of the U. S. Department of Agriculture at Arlington, Va.—Laboratory Techniques in the Study of Floods, by HAROLD A. THOMAS. Gives the mathematical formulae for model design for use in laboratory practice. Describes the construction of a few laboratory models of certain river reaches used in the study of flood wave problems.—The Mississippi River Flood Control Model, by K. E. FIELDS. Describes the features of the Mississippi River flood control model at the Vicksburg Experiment Station, gives the basic data used in constructing the model and lists some of the problems studied. Discussion by C. P. LINDNER describes the use of this model in solving the various problems encountered.—Flood Forecasting in Pennsylvania, by GEORGE WEBER, Jr. Gives the history of the Federal-State Flood Forecasting Service, the number of rain gages in the network and the use of the radio in expediting the transmission of rainfall amounts during flood periods. The details of the river stage forecast in connection with the Mar. 1941 flood on the Susquehanna R. are discussed. BERTRAM S. BARNES discusses the use of the ground-water index in forecasting stream flow.—The Flood of September 1938 at the Big Eau Pleine Dam in Wisconsin, by ARNO T. LENZ. Gives rainfall and runoff data for the maximum flood of record, September 9, 1938, at the Big Eau Pleine Reservoir on the Big Eau Pleine River.—The papers presented at this conference are grouped in 5 major so-called symposia, without, however, a very high degree of completeness of presentation of different angles of a given topic.—R. W. van Vliet.

21599. VISHER, S. S. Climate and geomorphology: Some comparisons between regions. *Jour. Geomorphology* 5(1): 54-64. 1941.—Compares typical topography of Indiana with that in some other distinctly different climates, and comes to the following general conclusions which while not new give students some clear examples of how climatology and physiography converge. (1) Regional contrasts in rainfall-intensity are of considerable physiographic significance. They have produced within a century in Indiana appreciable regional contrasts in amount and type of soil erosion and, where they have continued for a prolonged period (in the unglaciated region), have effected distinct regional contrasts in relief of a grosser type. (2) Regional contrasts in distribution of snowfall, in continually frozen ground, and in frequency of alternations of freezing and thawing are all significant in helping to cause contrasts in average angle of slope of north- and south-facing hillsides and in various other respects. (3) Climatic humidity (precipitation-evaporation ratio) is of physiographic importance in affecting the number of streams, amount of water surface, type of vegetation, and several other conditions. (4) As the number of valleys in regions of corresponding lithology and relief tends to increase with run-off, average slope tends to decrease from humid to arid regions. Correspondingly, with increased rainfall, the % of fairly level land tends to decrease and, in regions of corresponding maturity of erosion, to be restricted increasingly to flood-plains. (5) Cliffs are less common in humid than in drier regions under corresponding rock and relief conditions. (6) Badlands, although most extensive in semi-arid climates, develop slowly there because of small run-off, but develop rapidly on favorable slopes and materials in humid regions after deforestation. (7) Where comparable limestones occur, sinkholes are chiefly widened joints in warm rainy regions and are common, but in semi-arid regions they are chiefly due to the collapse of cavern roofs and are comparatively rare. Karsts are restricted to otherwise favorable areas possessing abundant rainfall and warmth during much of the year. (8) Accompanying climatic differences and vegetational contrasts induced thereby, topographic slopes differ in steepness, soil, rock exposure, run-off, and in various other respects. Various regional contrasts among north-facing slopes, for example, are partly due to climatic

differences associated with latitude, altitude, and exposure to significant winds.—R. G. Stone (in *Bull. Amer. Meteorol. Soc.*).

21600. YAGLOU, C. P. Report of sub-committee on physical procedures in air analysis. *Amer. Publ. Health Assoc. Yr. Bk.* 1938-1939: 62-67. 1938.—This report evaluates determinations and interpretations of comfort factors. Comfort involves balance between heat production and loss at normal body temp. with no sensation of effort. Factors are air temp., movement, humidity, and radiation, none of which affects comfort independently of the others. Their effects vary for different conditions of perspiration. In still air at 70° radiation and convection may account for 75% of the body heat loss, and evaporation 25%. Exercise may alter these values. The mechanism of perspiration must be taken into account. Between 75° and 90° is a critical value, depending on personal factors, at which sweating starts. At work it is lower. During the season of artificial heating, body heat loss depends largely on radiation and convection, at which time surface temp. of surrounding walls and objects, and air temp. and movement become important. The best single index of their combined effects is body surface temp. With summer temps. near those of the body's surface, humidity becomes important. The thermometer should be silvered or screened from radiation to take true air temp. Measurements of air motion usually depend on rate of cooling of heated bodies, which varies approx. with the square root of velocity. For air motion the dry katha thermometer is good from 30 to 400 f.p.m. in fairly horizontal currents. Silvered katas may be used to reduce errors due to radiation to but 4% (when air and walls differ considerably). A "blue" katha is quicker for near 90° F and up. Yaglou's heated thermometer anemometer measures velocities from 10 to 6,000 f.p.m. Aluminum paint on the bulb reduces errors due to radiation to 1.5%. A source of electricity is requisite. The hot wire anemometer is a laboratory instrument. Laboratory radiometers are not suitable afield but intensity of radiation from objects can be estimated by the globe thermometer if air temp. and movement are known. For most living and working conditions in the U. S., the extent of radiation met is not great. Instruments for composite indices of comfort have limited value. It is better to record and integrate all four basic factors to interpret conditions with respect to the type of occupancy. For light sedentary work 68° to 73° F with moderate or natural humidity, air movement < 40 f.p.m. and air and wall temps. not far apart are satisfactory during the heating season. Sojourns into cooled places in summer remain a difficult problem. Current practice follows a sliding scale from 4° to 15° below prevailing outside temps. when the sojourns exceed 40 min. This does not suit everyone. For men at work each set of factors needs to be worked out separately. In many cases increased comfort increases work output.—C. L. Pool (courtesy *Publ. Health Engineer. Absts.*).

ANIMAL

21601. COE, WESLEY R., and DENIS L. FOX. (Scripps Inst. Oceanogr., La Jolla, Calif.) Biology of the California sea-mussel (*Mytilus californianus*). I. Influence of temperature, food supply, sex and age on the rate of growth. *Jour. Exp. Zool.* 90(1): 1-30. 1942.—Monthly measurements of > 1000 mussels living under natural conditions during 2 calendar yrs. allow an evaluation of the influence of available food plankton, temp., season, age and sexual condition on the rate of growth. On the coast of Southern California the young mussel may reach a length of 86 mm. at the age of 1 yr., 129 mm. when 2 yrs. old and 150 mm. at the end of its 3d yr. Thereafter the rate of growth is much less. Monthly growth rates varied with environmental conditions. Growth in this locality is most rapid at 16-18°C and slowest when above 20°. Dinoflagellates of several spp., when abundant, furnish the principal food supply, supplemented by numerous other minute organisms, and cells, as well as organic particles from the disintegration of dead organisms. A rather close correlation between monthly growth rate and abundance of dinoflagellates, but not of diatoms or bacteria, was found. Mussels kept in the running water of the aquarium showed little if any growth, due to

lack of suitable food. Others in the same water but plentifully supplied with food grew about half as fast as those kept under natural conditions. The ♂♂ grew about 5% faster than the ♀♀. Dimensions of shell, vol. and wt. show nearly constant relations with increase in size.—Auth. (courtesy *Wistar Bibl. Serv.*).

21602. CREIGHTON, JOHN T. Factors influencing insect abundance. *Jour. Econ. Ent.* 31(6): 735-739. 1938.—Feeding expts. have indicated that diet deficiency affects the general vitality of insects and the prolificacy of the ♀♀. Tests made by the author indicate that elemental deficiency or variation may likewise materially affect the prolificacy of ♀♀. The so-called trace elements were given particular attention. Tests indicate the possibility of a long-range effect of elemental absorption upon insect populations. This absorption may be directly through the leaf surface or by way of the root system. Indications are in many cases insect populations increase following fungicidal applications may be due more to a physiological change in cell sap than to a destruction of beneficial fungi.—Auth. summ.

21603. DAVIS, DAVID E. (U. Chicago.) A new census method applied to Cuban birds. *Ecology* 23(3): 370-376. 1942.—A census method which compares the number of birds estimated in an area and the number of birds actually present in the area has been devised. The formula used is $Ne = MA/a$, where Ne is the estimated number of birds, M is the mean of the census, A is the total area, and a is the area of the sample. It is assumed that a representative sample area is used and that the technique of counting does not influence the results. To eliminate error due to day-to-day variation in census counts an arbitrary limit of variability, depending upon the available data, must be established. It is suggested that in comparing census counts the population per unit volume is a more significant measure of density than the population per unit area. Data used in developing this method were collected over a period of 7 mos. in 2 ecologically different localities in Cuba, in the garden of the Atkins Inst. of the Arnold Arboretum of Harvard Univ. at Cienfuegos, and at the Seboruco, a nearby woodlot. 18 spp. were studied in the arboretum and 17 spp. at the Seboruco. Of these certain spp. were not always amenable to the census method. The populations showed trends in relation to climatic change, migration, and breeding.—D. E. Davis.

21604. DICE, LEE R. (U. Michigan.) Ecological distribution of *Peromyscus* and *Neotoma* in parts of southern New Mexico. *Ecology* 23(2): 199-208. Mar. 1942.—Six spp. of *Peromyscus* and 3 spp. of *Neotoma* live in southern New Mexico. As many as 4 spp. of *Peromyscus* and 2 of *Neotoma* may live together as members of the same ecologic association. The 2 closely related spp. *P. nasutus* and *P. truei* sometimes occupy the same habitats and may be taken in the same lines of traps. Some kind of barrier other than an ecological one must therefore be responsible for their failure to interbreed in nature.—L. R. Dice.

21605. GREGG, ROBERT E. (State Coll., Duluth, Minn.) The origin of castes in ants with special reference to *Pheidole morrissi* Forel. *Ecology* 23(3): 295-308. 1942.—Expts. were designed to test the influence of the adult castes of *P. morrissi* on the development of the brood. Ants were reared from egg to adult in certain colonies composed only of workers, some only of soldiers, and others containing both workers and soldiers served as controls. The food of all colonies was similar in quantity and quality. The results show a significantly greater proportion of soldiers developed in the worker colonies than in either the soldier or control colonies. Virtual inhibition of this caste was obtained in soldier colonies, but workers appeared to develop about equally well in all three colony types. The inhibition of the development of soldiers is correlated with the presence of adults of that caste, and an exudate of the soldier body containing a special inhibitory substance is thought to be distributed to the larvae by the grooming habits of nurse ants. Soldiers appear to be extrinsically determined, probably after the hatching of the eggs, but the expts. provide no new evidence on the determination of the worker caste. The results are also in accord with a preponderance of the observational data of numerous investigators.—R. E. Gregg.

21606. JOHNSON, DOUGLAS. (Columbia U., N. Y. C.) Mussel distribution as evidence of drainage changes. *Jour. Geomorph.* 5(1): 59-72. 1942.—Johnson, author of a 1931 volume on stream sculpture on the Atlantic Slope, discusses the conclusions of Henry van der Schalie (1939), A. E. Ortmann (1913), and Chas. C. Adams (1901) upon the distribution of freshwater mussels in the Appalachian region. He concludes that transfer by stream capture is highly improbable partly because such captures are very rare, far more rare than was formerly assumed. Capture of drainage area is much less rare than of streams. A diverting valley lowers the water table and thus normally destroys the permanence of the stream in the captured drainage basin long before actual capture occurs, preventing direct transfer of aquatic fauna. Transfer of fauna from one stream to another is vastly more likely to occur near the mouths of the streams during floods. The relative uniformity of fauna in various nearby streams now distinct is readily explicable in light of the well known extensive oscillations of sea level incident to the accumulation and melting of continental glaciers. For example, the Susquehanna, Potomac and James Rivers were united into a single Chesapeake River during the ice age when the sea-level was some hundreds of feet lower than now. During the ice ages, faunal transference was facilitated also by radical disarrangement of drainage due to ice barriers, pounding, shifting of outlets, etc. Johnson concludes that the efficacy of the biologic agencies of overland transfer of mussels (birds, man, etc.) have been underrated by van der Schalie and others, and the importance of stream capture has been greatly overrated.—S. S. Visher.

21607. LUDWIG, DANIEL, and JOHN MAXWELL ANDERSON. (New York U.) Effects of different humidities, at various temperatures, on the early development of four Saturniid moths (*Platysamia cecropia* Linnaeus, *Telea polyphemus* Cramer, *Samia walkeri* Felder and Felder, and *Callosamia promethea* Drury), and on the weights and water contents of their larvae. *Ecology* 23(3): 259-274. 1942.—Fertile eggs of 4 spp. of Saturniid moths were subjected to temps. between 15° and 32.5°C and to rel. humidities from 0 to 100%. At each temp., there is a range of humidities opt. for hatching, extending in most cases from 56 to 76%. However, the limits of humidity tolerated by each sp. are determined by temp., the humidity range being definitely narrowed by exposure to either high or low temps. In most cases, except at temps. in the optimum range, the duration of the egg stage was prolonged by low humidities. At all temps., eggs in saturated air gained wt. by the absorption of water, and at low temps., and initial increase in wt. was exhibited in humidities as low as 60%. The number of larvae which developed but failed to hatch was greater at very high and low humidities than in the optimum range. At high humidities, the growth of molds killed many of the larvae, and in dry air, many were killed by desiccation after having perforated the shells. The rate of wt. loss by the eggs may be correlated with their size and with the rate of development. The smaller eggs dehydrated more rapidly than the larger ones, except for the large, discoidal egg of the Polyphemus moth. This egg was able to develop and hatch over a wider range of temps. and humidities than those of the other species, because their more rapid development permitted hatching before excessive dehydration occurred.—Daniel Ludwig.

21608. MOORE, WALTER G. (U. Minnesota.) Field studies on the oxygen requirements of certain fresh-water fishes. *Ecology* 23(3): 319-329. 1 fig. 1942.—The delimitation of dissolved O₂ thresholds for various spp. of fishes was attempted under field conditions, using a long exposure period since it was found that O₂ tensions near the critical level were only very slowly lethal. O₂ concs. of < 3.5 ppm. at temps. of 15-26°C were fatal within 24 hrs. to most individuals of the 8 spp. tested; 5 ppm. and over was completely non-lethal to all spp. tested under the above conditions. O₂ concs. of < 2 ppm. at temps. of 0-4°C were fatal within 48 hrs. to most of the 12 spp. tested; 1 ppm. and under was fatal to all spp. tested except occasional individuals of *Ameiurus melas*; while 3 ppm. and over was non-lethal to all spp. tested under the above conditions. Small fishes were less tolerant of low O₂ tensions

than were larger fishes of the same species, at both summer and winter temps.—W. G. Moore.

21609. PRICE, W. ARMSTRONG. (Corpus Christi, Texas.) Migration of fresh-water biota via stream confluences of coalescing deltas. *Jour. Geomorph.* 5(2): 167-170. 1942.—Geologic study of the Pleistocene rock formations of the Gulf Coast reveals that from western Florida to northern Mexico they are deltaic. During the low sea-level stages incidental to continental glacial accumulation, the several rivers entering the Gulf formed deltas which coalesced. The shifting channels characteristic of deltas afforded opportunities for migration of the biota from stream to stream. The fact that Mississippian molluscan spp. inhabit all the rivers of Texas is thus readily explicable.

—S. S. Visher.

21610. STEPHENSON, W. (Durham U.) An ecological survey of a beach on the Island of Raasay. *Proc. Univ. Durham Phil. Soc.* 10(4): 332-357. 7 fig. 1942.—The heights of the different parts of a beach on the Inner Hebrides, Scotland, were noted by means of contour lines. These lines were then calibrated with respect to % exposure to the atmosphere. The zones of the dominant algae occupied different ranges of % exposure on different parts of the beach, and these differences are largely explicable in terms of the mechanical shock of wave action. The commoner burrowing animals showed a succession of spp., and critical distribution levels were noted at 0%, 10%, 20%, and 50% exposure. Critical levels were also noted for surface living animals corresponding to 10%, about 25%, and 60% exposure. Both series of critical levels were largely independent of physical discontinuity, and the suggestion is put forward that both types of animals are divisible into ecological groups which are critically and similarly affected at each of the particular levels.—W. Stephenson.

PLANT

21611. ALLARD, H. A. (U. S. Dept. Agric., Washington, D. C.) Lack of available phosphorus preventing normal succession on small areas on Bull Run Mountain in Virginia. *Ecology* 23(3): 345-353. 3 fig. 1942.—A study was made of the soils of certain bare areas on the west slope of Bull Run Mt., Fauquier County, Va., to determine why such areas in some pastures remained persistently bare and mostly free from the normal vegetative successions for many years. Pot tests in the greenhouse using tobacco, beans, millet and cowpeas, as well as small field plot tests using different quantities of K₂O, P₂O₅ and N, as well as some of the trace elements, indicated an extreme lack of available P and N. While the normal broomsedge cover failed completely to develop on these areas, a number of forbs, including *Ipomoea pandurata*, *Euphorbia corollata* and *Convolvulus spithameus* grew fairly well here. Reference is made to similar barren areas or "scree" in Scotland, which remain devoid of vegetation for a lifetime, and it is suggested that chemical deficiency as much as physical factors may be responsible for these.—H. A. Allard.

21612. ANDERSON, KLING L. (Agric. Exp. Sta., Manhattan, Kans.) A comparison of line transects and permanent quadrats in evaluating composition and density of pasture vegetation of the tall prairie grass type. *Jour. Amer. Soc. Agron.* 34(9): 805-822. 1 fig. 1942.—A comparison of randomized line-transects and permanent, meter-square quadrats for sampling density and species composition was made on 2 pastures of the tall grass prairie type in the vicinity of Manhattan, Kansas. In the quadrats, clumps of vegetation were charted in square cm. of area occupied at the ground surface, while individual culms were given a value of 1 sq. cm. In the transects all vegetation that came into contact with a 10-m. length of 3/32-inch steel cable stretched as near the ground level as possible was recorded. Clumps of vegetation were recorded in cm. along the wire and individual culms were given a value of 1 cm. Assuming the sampled strip to be 1 cm. in width, these were considered as square cm. of area occupied to permit direct comparisons. The general agreement between the 2 methods was fairly close, but the quadrats failed to give accurate estimates of species which were not uniformly distributed over the pasture, due, undoubtedly, to the lack of sufficient sampling. The quadrats were found likely to fail to sample

widely scattered, though sometimes dense areas of a particular species; on the other hand they occasionally fell directly on such an area and gave undue emphasis to a particular species. The transect method is more rapid and therefore a larger number of samples may be taken in a given period. Furthermore, the samples are taken at random and, therefore, are not subject to the personal bias that might be encountered in the selection of representative areas for the establishment of permanent sampling plots. In addition to providing a better comparison between pastures, the line-transect method of sampling gives a better estimate of the variability within pastures as the area is sampled in a greater number of more widely distributed points.—K. L. Anderson.

21613. BRAMBLE, WILLIAM C., and MAURICE K. GODDARD. (Pennsylvania State Coll.) Effect of animal coaction and seedbed condition on regeneration of pitch pine in the Barrens of central Pennsylvania. *Ecology* 23 (3): 330-335. Map, 1 fig. 1942.—A study of the effect of animal coaction and seedbed condition on germination of seeds and early survival of seedlings of pitch pine has been made by means of seedspots in 3 typical plant communities of the scrub oak Barrens of central Pennsylvania. In the aspen and scrub oak communities, destructive animal coaction added to unfavorable natural seedbeds prevented establishment of pitch pine from seeds. In the grass community, unfavorable seedbed conditions were sufficient to cause failure of pitch pine to become established. So far as was observed, whitetailed deer had no significant effect on the early survival of seedlings, the animal destruction being caused by small mammals and birds which could reach the seedspots fenced against deer, but could not reach the caged seedspots. Covering of the seeds with either soil or sod brought about successful germination and low survival in the grass community without protection from animals and birds, but similar treatment in the aspen and scrub oak resulted in failure. The most successful treatment on protected seedspots in aspen and scrub oak communities was sowing the seed on mineral soil and covering with soil. Merely sowing the seed on mineral soil gave the best results in protected seedspots in the grass community.—Auth. summ.

21614. CAMP, W. H. (New York Bot. Gard., N. Y. C.) Ecological problems and species concepts in *Crataegus*. *Ecology* 23(3): 368-369. 1942.—There are today $> 1,100$ described spp. of *Crataegus* in N. America, many of these known only from single collections. On the basis of the available information it would appear that many if not the majority of these are triploids and apomictic. The apomicts, of course, will produce duplicate offspring. Because of the biological nature of the genus, the ecologist attempting to use its species critically will find, if he follows the nomenclatural "lumpers," that the species have a wide morphological variability and considerable ecological diversity. Conversely, if he follows the "splitters," whose species are narrowly delimited, being for the most part apomictic clones, he will often be dealing only with local races having rather sharply defined limits of ecol. tolerance.—W. H. Camp.

21615. DUGHI, RAYMOND. Domaine de stabilité de la symbiose lichénique. L'énanthoxérie. *Compt. Rend. Acad. Sci. [Paris]* 208(5): 379-381. 1939.—Studies for several yrs. on 100 corticolous lichens and saxicolous Collemaceae from Provence have indicated that the injurious effect of anhydrobiosis in the lichens is manifested in very obvious cellular lesions which first affect the gonidia, then the fungus in lichens with protococcaceous gonidia; the fungus, then gonidia of lichens with cyanophycean gonidia; and finally the entire thallus in either case. Only in hypophloedal crustose lichens is there a concomitant effect on both constituents. From the rather deep lesions of the whole lichen and especially from the lesions of 1 of the 2 symbionts, there is induced a physiol. disequilibrium and total or partial destruction of the lichen complex. Consequently the amplitude of resistance of a given species to drying-out is regulated, in some cases by the gonidia (Lichens with Chlorophyceae), in others by the fungus (Lichens with Cyanophyceae). The resistance to drying-out, designated by the author as "énanthoxérie," is measured

by the period of dryness which causes the first visible cellular lesions, or is evaluated by the microclimate of the driest station wherein a lichen can live. Since this resistance is very variable in nature with different spp., they may be arranged in a series of decreasing or increasing "énanthoxérie." Thus "énanthoxérie" is an expression of the limits of the sphere of existence of the lichen symbiosis in conformity with the rhythm of the periods of dryness of the lichens in their natural habitats. Conversely, "énanthoxigrie" expresses the limits of the sphere of existence of the lichen complex according to the rhythm of periods of imbibition.—W. B. Drew.

21616. DUGHI, RAYMOND. Domaine de stabilité de la symbiose lichéique. L'énanthoxigrie. *Compt. Rend. Acad. Sci. [Paris]* 208(25): 2017-2019. 1939.—Studies of 100 lichens from a large area in Provence have led the author to the conclusion that all the lichens examined were first altered, then dissociated, and finally killed when saturation of the thallus was prolonged. The resistance of the lichen complex to moisture saturation (l'énanthoxigrie) is very unequal according to species, which can thus be arranged in a comparative series of increasing "énanthoxigrie." It is necessary to distinguish in the phases of hydrobiosis of a given species between periods of saturation and evaporation, because by their frequency and duration the former limit the extension of a species (according to its degree of "énanthoxigrie") toward humid climates, whereas by their means, as well as by their frequency and duration, the latter determine, with temp., the rate of growth of individuals. Furthermore, a strong "énanthoxérie" does not always correspond to a weak and reciprocal "énanthoxigrie." A rational ecological classification of lichens should include consideration of resistance of species to dryness and to humidity.—W. B. Drew.

21617. EDMONDSON, CHARLES HOWARD. Viability of coconut seeds after floating in sea. *Bernice P. Bishop Mus. Occas. Papers* 16(12): 293-304. 2 fig. 1941.—Expts. showed coconuts capable of developing after floating in sea up to 110 days. After contact with sea water exptl. coconuts required periods ranging from 3 months to over a year to exhibit visible development. There seems to be little correlation between floating time and time required for visible sprouting. While floating, the husk may absorb large amounts of sea water, but the seed is adapted for its exclusion and the young shoot is apparently not seriously affected. Excessive dryness may inhibit development after germination has begun. Germination may begin and continue while the coconut floats in the sea. Little water is absorbed by husk of a coconut floating on undisturbed sea water, and germination and visible sprouting readily occur.—E. H. Bryan, Jr.

21618. GATES, FRANK C. The bogs of northern lower Michigan. *Ecol. Monogr.* 12(3): 213-254. Map, 29 fig. 1942.—The result of 30 yrs. study of the many bogs of Emmet and Cheboygan Counties, Mich., bringing out their characteristics, floristics and successional relationships of their associations. The appearance of the matforming sedge, *Carex lasiocarpa*, initiates the usual bog sere. It is followed in turn by the *Chamaedaphne* association of ericaceous shrubs, the High bog shrub assoc. and then by coniferous tree associations, *Larix*, *Picea mariana* and culminating in the *Thuja* assoc. The successional relationships are shown in a diagram, the ecol. position of the spp. in a table and the outstanding associations are contrasted with vegetation formulas. Among the plant families well represented by numerous spp. in these bogs are the Ericaceae, Cyperaceae, Orchidaceae and Ranunculaceae; the Poaceae is poorly represented and legumes are absent. Bogs in this region are more valuable as water reservoirs and shelter and feeding ground for wildlife than for agriculture.—F. C. Gates.

21619. GLENDENING, GEORGE E. (Southwestern Forest and Range Exp. Sta., Tucson, Ariz.) Germination and emergence of some native grasses in relation to litter cover and soil moisture. *Jour. Amer. Soc. Agron.* 34(9): 797-804. 1942.—Seeds of 10 native perennial grasses were planted in replicated plots under 8 treatments, including cultivation and covering the surface soil with various kinds of litter, on a depleted semidesert grassland range south of Tucson, Ariz. Provision was made on an adjacent plot to obtain moisture samples at surface, 6-inch, and 12-inch depths of

bare soil, soil covered with straw litter, and soil covered with open mesh gauze fabric. The moisture content at all levels was consistently greater under straw and gauze than on bare ground. The surface soil held available moisture longest under a litter of straw. Any cultural treatment, whether by actual application or as may be induced by conservative grazing practices that result in an accumulation of litter, tends to increase the moisture content of the surface soil and to aid in the germination and establishment of grass seedlings. Germination and emergence of seedlings was increased from 4 to 20 times over that of bare soil by the different surface-soil treatments.—S. C. Martin.

21620. KINLOCH, J. B. Mapping vegetational types in British Honduras from aerial photographs. *Caribbean Forester* 1(2): 1-4. 1940.—Mapping of the vegetation types of the densely wooded, sparsely inhabited Colony was made possible by the interpretation of aerial photographs. Ground work of the vegetation survey provided the starting points for the interpretation of the aerial data. Individual canopy spp., especially when in flower, can be recognized from the usual flying heights of 1,000 to 2,000 ft. Approximate contouring provides further clues to the associations examined. Palm associates are important indicators; the larger the canopy palms, the taller is the forest. The identification and measurement of the available volumes of timber is important in the development of a wider utilization of the country's resources in addition to the one export sp., mahogany.—J. W. Bacon.

21621. MARKS, JOHN B. Land use and plant succession in Coon Valley, Wisconsin. *Ecol. Monogr.* 12(2): 113-133. 8 fig. 1942.—Explorer's and settlers' accounts agree that American Indian hunting fires had reduced forests in the Coon Valley, Wisconsin, Soil Conservation Area to a scrub of *Quercus rubra* and *Q. alba*. In protected spots *Acer-Tilia* and prairie communities survived. White settlement checked fires, allowed *Q. rubra* forests to come to maturity, and, through exploitative grain and dairy farming, introduced new destructive successions. Extreme erosion in pasture is characterized by *Digitaria sanguinalis* and *Ambrosia artemisiifolia*. Grazed and eroded woods show invasion of grassy species and expansion of *Circaea latifolia* and *Pilea pumila*. Grazed woods are drier, sunnier, and the soil reaction is higher than in the ungrazed. The Soil Conservation Service, entering the valley in 1933, has initiated soil conserving practices which have produced new recovery communities. Woods newly protected from grazing show decrease in grasses and appearance of many composites. Healing gullies show *Equisetum arvense*, *Solidago canadensis*, and *Sambucus canadensis*. The regional succession is prairie, to brush, to *Q. velutina*, to *Q. rubra*, to *Acer-Tilia* woods.—J. B. Marks.

21622. PALLMANN, H., E. EICHENBERGER, und A. HASLER. (E. T. H., Zürich, Schweiz.) Eine neue Methode der Temperaturmessung bei ökologischen oder bodenkundlichen Untersuchungen. *Ber. schweiz. bot. Gesellsch.* 50: 337-362. 4 fig. 1940.—A new method for determining soil temps. has been developed which is inexpensive and advantageous for field use. A 20-50 ml. glass ampule filled with a standardized, sterile, sugar buffer soln. is used as the measuring device. This is protected by a metal container and buried in the soil to any desired depth and the mean temp. for a definite time interval is detd. by measuring polarimetrically the inversion rate of the sugar soln. A complete description of the construction and standardization of the measuring device is given.—W. C. Bramble.

21623. PEARSON, G. A. Herbaceous vegetation a factor in natural regeneration of ponderosa pine in the southwest. *Ecol. Monogr.* 12(3): 315-338. 11 fig. 1942.—Plots on which the native vegetation, mainly *Festuca arizonica*, was subjected to various treatments were seeded with *Pinus ponderosa* in 1928, 1929, 1937, and 1938. Treatments consisted of denuding followed by weeding for several yrs., denuding without subsequent weeding, and clipping twice annually to various heights. The vegetation was left undisturbed on control plots. Records on each plot have been carried from the time of seeding to 1941. Both survival and growth have been strikingly better where competing vegetation was entirely eliminated. Clipping the grass proved beneficial in proportion to closeness of clipping. Competi-

tion for soil moisture is regarded as the dominant factor, with light secondary.—G. A. Pearson.

21624. SCHULMAN, EDMUND. (U. Arizona.) Dendrochronology in pines of Arkansas. *Ecology* 23(3): 309-318. 1942.—Early wood, late wood, and total ring-width chronologies 160 yrs. in length were developed for *P. echinata* from the Ouachita Mts. Annual late wood accretion closely parallels the summer precipitation, July-Sept., and is inversely proportional to mean temp. for the same interval. Early wood growth shows only a weak relation to year-to-year fluctuation in precipitation and temp. The late wood-early wood ratio is developed as a new tool in crossdating studies on pine, with potential application to the dating of archaeological material such as building timbers in the area.—Edmund Schulman.

21625. SHIRLEY, HARDY L. (Allegheny Forest Exp. Sta.), and PAUL ZEHNGRAFF. (Lake States Forest Exp. Sta.) Height of red pine saplings as associated with density. *Ecology* 23(3): 370. 1942.—Height of 18-yr.-old red pines in Minnesota showed a positive correlation with density, the correlation coeff. being 0.609 ± 0.015 . Trees spaced 20×20 ft. averaged 5.5 ft. in height; those spaced 5×5 ft., 14 ft. This difference existed irrespective of the height attained at 8 yrs. of age. Other observations indicate that survival during droughts is higher and the soil less compact where trees are spaced closely enough to provide mutual protection, yet still are not overcrowded.—H. L. Shirley.

21626. SHREVE, F. The desert vegetation of North America. *Bot. Rev.* 8(4): 195-246. 1 fig. 1942.—This is a comprehensive review (over 2 pages of references) considering desert vegetation, including life forms of the desert and the structure and floristic composition of desert vegetation; and the geographical area of the N. American desert, with brief descriptions of the features which differentiate its several parts, together with brief discussion of the arid regions of southern Mexico.—Courtesy Exp. Sta. Rec.

21627. STOECKELER, JOSEPH H., and GUSTAF A. LIMSTROM. Ecological factors influencing reforestation in Northern Wisconsin. *Ecol. Monogr.* 12: 191-212. 1 fig. 1942.—In a series of expts. on planting and seeding of northern conifers on sandy submarginal land in northern Wisconsin, survivals on open sites ranged from 84% to 97% for red and white pine planting done in yrs. of normal precipitation, and from 14% to 45% in a season when rainfall was 34% of normal from May to Sept., inclusive. In the same drought yr., plantations under a light 20-ft. overstory of aspen survived fairly well because of beneficial effect of the overstory in reducing evaporation, and values ranged from 64% to 83% survival. Plantings on sandy areas with water table at 4 to 6 feet had survivals of 64-85% in spite of drought, because of better moisture relations than on upland sites. Larvae of May beetles caused up to 33% mortality on some plantings in a single season. Growth rate of jack pine was about double that of red pine in the first 4 yrs. after field planting. Jack pine's ability to live through drought better than red pine in young plantations is attributed to a much faster-spreading root system. These 2 spp. make most of their root growth downward in the 1st season and laterally the 2d. Permanent water tables, which remain at 2-5 ft. below the surface of sandy soils, make easy the establishment of 800-6200 seedlings per acre by direct seeding even in drought years. On uplands, without benefit of water table, there usually were only 200 to 500 seedlings per acre. Jack and red pine fared best in direct seeding trials. Shallow water tables on these sites have a pronounced effect in reducing soil surface temps. by as much as 47°F and thus reducing heat injury to newly germinated seedlings. Rodents, chiefly white-footed mice, took 37, 48, and 23% respectively of seed of jack, red, and white pine and are considered a serious obstacle to successful direct seeding of conifers in the Lake States. Once the seedlings have grown for a season, one of the chief causes of subsequent loss is the smothering of the small seedlings in the furrows by the dead leaves of deciduous trees and shrubs on the site.—J. H. Stoeckeler.

21628. WEAVER, J. E., and IRENE M. MUELLER. (U. Nebraska.) Rôle of seedlings in recovery of midwestern

ranges from drought. *Ecology* 23(3): 275-294. 12 fig. 1942.—Midwestern ranges have undergone severe drought for 7 yrs. Little seed has been produced by the range grasses and it seemed probable that available seed had nearly all germinated, as a result of brief periods with moisture, and the seedlings had died. Several square-foot samples of the surface 0.5 inch of soil were collected from each of 49 prairies and ranges in 28 counties in Nebr., Kans., and Colo. in very early spring of the wet yr. 1941. All viable seeds were germinated. 26 spp. of grasses and 40 of forbs furnished an av. total of 67 seedlings per sample. 96% of the forbs were weeds, chiefly *Amaranthus* spp. and *Salsola pestifer*. 20% of the grasses were ruderals, mostly *Eragrostis cilianensis* and *Hordeum pusillum*. Seedlings of grasses slightly outnumbered the forbs. *Sporobolus cryptandrus*, *Bouteloua gracilis*, and *Buchloe dactyloides*, all of high forage value, furnished 73% of the grass seedlings. Viable seeds of native perennial forage grasses, with rare exceptions, were present in such small numbers (av. 26 per sq. ft.) as to be of limited value, when seedling hazards are considered, in restoration of the vegetation. Numbers and kinds of seedling grasses were ascertained in June by random selection and careful examination of 25 separate square-foot areas in each of 22 of the ranges where samples were secured earlier. Both soil sampling in April and June and Weather Bureau records showed that conditions for establishment of seedlings had been very favorable. Since the diverse population of weeds in these ranges greatly affects the establishment of seedlings, they were carefully studied and described. Of 550 sq. ft. of soil on which seedling grasses were counted, 37% supported none. *Sporobolus cryptandrus* and *Bouteloua gracilis* were the most widely distributed and most abundant of seedling perennial grasses. Av. distribution of perennial grass seedlings over the whole area was 4.3 per sq. ft.; in the ranges west of the 100th Meridian only, 2.4 per unit area. Even if all seedlings (exclusive of the stoloniferous *Buchloe dactyloides*) had survived and made a max. growth, they would have increased the cover less than 2%. Restoration of these ranges will require several yrs.—J. E. Weaver.

21629. WOLFE, JOHN N. (Ohio State U.) Species isolation and a proglacial lake in southern Ohio. *Ohio Jour. Sci.* 42(1): 2-12. Map. 1942.—About 100 spp. of plants, including algae, mosses, lichens, fungi, ferns and flowering plants appear to be isolated in southern Ohio in several well-delimited areas having elevations above the 900-ft. level. Conspicuously absent, however, are corresponding spp. characteristic of swamp forest and other lowland habitats. The possible relations between events in the physiographic history of southern Ohio and the peculiar distribution and ecol. composition of this flora are discussed. There seem to be no present-day factors that would exclude these spp. from other localities in southern Ohio, or account for the absence of lowland spp. The most significant event that might account for both of these phenomena is the formation of a vast proglacial lake with a complex of irregular branches at the time of the first advance of Pleistocene ice into the region. The extent of this lake at one stage is shown on a map. The destruction of lowland species by flooding and the survival of others on islands and peninsulas in early Pleistocene time is inferred. The areas in which most of these spp. have survived are today, either above the lake level or at lower elevations near former peninsulas and islands in this lake. Other effects of this event on existing vegetation and its subsequent development included: modification of edaphic conditions as the result of lacustrine deposits in the flooded region; formation of a diversity of habitats as a result of deep downcutting of streams after their reversal due to overflow across low divides to the west; modification of air temps. over and adjacent to, the flooded area.—J. N. Wolfe.

OCEANOGRAPHY

(See also B. A. 16(9): Entries 19533, 20479, 21296, 21300)

21630. HARVEY, H. W. (Marine Biol. Assoc., Plymouth.) Production of life in the sea. *Biol. Rev. Cambridge Phil. Soc.* 17(3): 221-246. 1942.—This review deals with the production of plants in the sea, which is controlled by a mosaic of factors, many of which are interrelated. Ob-

servations are collected and discussed, which relate to (i) the compounds of N and P directly utilized by the phytoplankton, and their rate of supply to the photosynthetic zone; (ii) the depth of this zone, which is detd. by the quantity of light energy entering the water daily and the transparency of the water; (iii) the influence of temp., of light, and of the conc. of nutrient salts, upon the growth rate of some diatoms; (iv) the dual effect of turbulence which, on the one hand, carries nutrient salts from below into the photosynthetic zone and, on the other hand, carries plant organisms to depths below the zone and, in some areas, increases the turbidity of the water thereby reducing the depth of the photosynthetic zone; (v) grazing by herbivores which deplete the breeding stock of plants but also excrete nutrient salts directly into the photosynthetic zone; (vi) the regeneration of nutrient salts by bacteria and enzymes; (vii) the supply of Fe and other trace elements, of which Mn and divalent S compounds are needed by some spp. of diatoms. The supply of such minor constituents is thought to play a considerable rôle in the distribution of plant life in the southern S. Atlantic, where there is a high conc. of nutrient salts in the waters throughout the year and great differences in the density of the flora between different areas. Estimates of the magnitude of the annual production of plants below a sq. meter, arrived at by various indirect methods, are compared. Fluctuations in the annual plant production from yr. to yr. in the English Channel, assessed from the quantities of phosphate present in the water during the winter, show a marked correlation with the density of the fauna. Recent attempts to estimate the standing crop of phytoplankton in terms of food for animals are described, and tentative estimates of the C and P content of the standing crop below a sq. m., when at its maximum in several seas, are compared.—H. W. Harvey.

21631. OLSON, R. A. (*Chesapeake Biol. Lab.*), H. F. BRUST (*U. Pennsylvania*), and WILLIS L. TRESSLER. (*U. Maryland*) Studies of the effects of industrial pollution in the lower Patapsco river area. I. The Curtis Bay Region, 1941. *State Maryland Dept. Res. and Educ.* 43. 1-40. Map, 1 fig. 1941.—An intensive study of the effect of copperas and its decomposition products on the biol. productivity of a portion of Baltimore Harbor, known as Curtis Bay, was carried out during the years 1938-40. The most severe effect of copperas disposal was that of lowered O₂ tension of the subsurface waters during the summer. The deleterious effect was demonstrated by data on plankton and this indirectly adversely affects higher organisms dependent on such matter and directly it adversely affects them by asphyxiation; pH appeared to be less significant. Plankton analysis showed some serious but local effects which appeared to be the result, in part at least, of waste acid disposal and not entirely due to the hydrolysis of copperas discharge. Ferric hydroxide flocculates and carries down with it a large part of both micro- and macro-plankton as well as contributing to a marked ecological unbalance on the entire bottom of the area through its continual accumulation. Core samples taken in the area showed much less ferric hydroxide deposited than was estimated from the data obtained as to the amt. of copperas discharged from the industrial plants; evidently the floc must continue much farther out from the area and probably beyond sta. 1 located in the Patapsco River near Fort Carroll. Both laboratory and field studies showed that 3 days or more are often required for complete settling and that abnormal conditions may greatly prolong this period. The effects of tide in the region were far less significant than was thought from previous studies. Currents from tides were unable to carry the effluents more than $\frac{1}{2}$ mi. from the source of disposal under normal conditions. It had been previously recommended that disposal be effected 1 hr. after max. flood tide but these studies have shown that such a practice, while it minimizes the occurrence of visible disposal products in the immediate area, allows the effluent to be discharged in one local mass which can move only a short distance before the disposal of the subsequent accumulation of copperas is discharged. This mass of polluted water remains undiluted and its effects are severe because it is confined to a relatively small area. When the accumulated copperas is discharged during a brief period on the ebb tide the O₂ requirement entirely depletes

the local area into which it is discharged. Disposal over a longer period of time would require far less mixing and diluting and it was suggested that this procedure be adopted so that flushing would spread over the entire ebb tide. Some other means of disposal would be necessary completely to remedy the situation; the use of aeration towers, or spray heads in order to pre-oxidize the material should, if feasible, prove effective. The resulting ferric hydroxide sludge could be carried to evaporation basins for drying and disposal either commercially or on dumps.—W. L. Tressler.

21632. SPILHAUS, A. F. A detailed study of the surface layers of the ocean in the neighborhood of the Gulf Stream with the aid of rapid measuring hydrographic instruments. *Jour. Marine Res.* 3(1): 51-74. 18 fig. 1940.—Description of an instrument, the Bathythermograph, for obtaining continuous temp. and pressure readings at sea. A spiral bourdon element activates a needle which records the temp. on a glass slide which is moved by a pressure-sensitive element. The resulting track is transferred to a calibration chart. This instrument was successfully used for obtaining a series of records at speeds of 7 to 11 knots. A water sampler, designed to obtain a series of samples of sea water at different depths (operating by pressure on the various valves) is also described. Both instruments produced results comparable to the standard, slower methods, and it is hoped to combine them into one instrument with certain mechanical improvements. A series of simultaneous salinity samples and temp. and pressure records will greatly speed the assembling of oceanographical data and be of especial value in charting eddies and minor variations of ocean currents in the surface layers of the ocean.—J. W. Hedgpeth.

21633. TOPPING, FRANCIS L., and JOHN L. FULLER. (*U. Maine*) The accommodation of some marine invertebrates to reduced osmotic pressures. *Biol. Bull.* 82(3): 372-384. Map. 1942.—A survey was made of the common invertebrate spp. in the Narraguagus River and Bay on the coast of Maine. This was correlated with the osmotic pressure (o.p.) at each collecting station at high and low tide. Water confined in the mud flats was collected by a special sampler. This water has a higher o.p. than surface water even at high tide. Marine spp. were found in 19% sea water. Tests on 14 spp. showed that 13 could survive exptl. exposure to o.p. below that of their natural environment. Individuals of a given sp. collected from brackish water were more resistant to dilute sea water than those from the open sea. *Nereis virens* survived a longer period in fresh water as more time was allowed for accommodation. This sp. was able to adapt to gradual dilution down to 16% sea water without wt. change; below this point a rapid increase in wt. occurred accompanied by increased O₂ consumption. These effects were reversed by gradual return to sea water.—J. L. Fuller.

LIMNOLOGY

(See also Entry 22779)

21634. DAVIS, C. L. Jr. (*Louisiana Dept. Conserv.*) Biological treatment of sulphate mill waste. *Louisiana Conserv. Rev.* 10(1): 36-39. 2 fig. 1941.—At the Southern Kraft plant, Springhill, La., the B. O. D. (biol. oxygen demand) of combined waste from pulp mill, bleach plant and paper mill, impounded for long periods before discharge into a bayou at times of high water, may vary from 55 to 240 (ppm. O₂). An exptl. biofilter unit, furnished by the Dorr Company, was circulated with aerated activated sludge from a sewage plant for 2 hrs. and gradually replaced by waste paper mill water. Between the limits of 5.1 and 10.2 gallons per sq. yd. per min. a reduction of approx. 30% in the B. O. D. was brought about by the biofiltration treatment. Until more complete analysis of the wastes, the reductions cannot be accepted as limiting values.—Gordon Gunter.

21635. GILBERT, J. Y. (*Scripps Inst. Oceanog., U. California, La Jolla*) The errors of the Sedgwick-Rafter counting chamber in the enumeration of phytoplankton. *Trans. Amer. Microsc. Soc.* 61(3): 217-226. 1942.—Errors incident to use of the Sedgwick-Rafter slide are separated and examined. Random distribution constitutes the only error essentially significant. The distribution of occurrences was found to approximate the Poisson distribution and the

frequency distribution of total cells of phytoplankton was shown to be unpredictable.—W. E. Allen.

21636. LAUPPER, KARL. (E. T. H., Zurich.) Der Sihlsee bei Einsiedeln. Beitrage zum Problem der Besiedlung eines voralpinen Stauses. *Ber. schweiz. bot. Gesellsch.* 50: 425-474. 7 fig. 1940.—An investigation of the plankton colonization of an artificial lake impounded to produce electric power has been made to follow the development of microscopic plant and animal life during the first 3 yrs. of its impoundment. Microorganisms in the original pools, peat pits, and ditches of the valley were investigated first. Desmidaceae were of dominant significance among the rich algal population. The water fauna was but sparingly developed. With filling of the lake some of the earlier forms increased significantly while others became scarce so that in the first weeks a new biotope was developed, disappearing later. New forms soon appeared in the lake, possibly brought by waterfowl from other lakes. The water rapidly became neutral or slightly alkaline in contrast to the strong acid reaction in the small biotopes formerly present. The Diatoms and Schizophyceae became few in number and the Desmids failed to develop. Chrysomonadinae and Chlorophyceae dominated alternately, as the lake had not yet reached a chemical-biological balance. Among the zooplankton certain Rotatoria, and *Daphnia longispina* and *Cyclops* sp. developed better than other organisms.—W. C. Bramble.

21637. NEEDHAM, JAMES G. (et al.). A symposium on hydrobiology. ix + 405p. Frontispiece, 4 maps, 23 fig. University of Wisconsin Press: Madison, 1941. Pr. \$3.50.—This book contains the 32 papers presented in the invitation program and abstracts of 16 papers given in a volunteer program of a symposium on hydrobiology held at the Univ. of Wisconsin Sept. 4-6, 1940. The various papers cover a wide range of subjects; they deal with social, economic, geological, physical, chemical, biological, sanitary and medical phases of hydrobiology.—Chancey Juday.

21638. RAWSON, DONALD S. (U. Saskatchewan, Saskatoon, Sask., Canada.) A comparison of some large alpine lakes in western Canada. *Ecology* 23(2): 143-161. Map, 1 fig. 1942.—Four lakes on the eastern slope of the Canadian Rockies have been compared among themselves and with 2 lakes in the Central Plateau of British Columbia. They are all oligotrophic, mountain lakes, cold, well oxygenated and with one exception they lie in deep narrow basins. Two of them, Bow and Maligne, are heavily silted in summer. Three lakes have high and 3 low mineral content in their waters. The net plankton and the macroscopic bottom organisms have been measured as an indication of the biol. productivity. The amt. of plankton are low, and the bottom fauna very low, as compared with production in eutrophic lakes. The amt. of plankton shows a high correlation with the mean temp. of the upper 10 m. of water and with the mineral content of the water. The amt. of bottom fauna is proportional to the amt. of plankton except in 2 unusually deep lakes where the bottom fauna is scanty. This series of lakes shows a wide variation in geological surroundings, climate and morphology of the basins. It is thus useful as a demonstration of the relative effects of these conditions on the productivity of the lakes. In each case the favorable effect of one or more of these influences is opposed by the unfavorable effect of the others. Thus none of these factors can be considered as dominant in these lakes. The fact that present fish production bears little relation to the capacity suggested by the supply of plankton and bottom fauna, provides a challenge to fish culturists in the region.—D. S. Rawson.

21639. RENTZ, GERHARD. Das Zooplankton der Hidensee-Rügenschen Bodengewässer und seine Produktionsphasen im Jahreszyklus. *Arch. Hydrobiol.* 36(4): 588-675. 1940.—The quantitative production as well as the quality of zooplankton in a number of inland bodies of water near Ostsee was studied. The waters are high in salt content but of such uniformity throughout the habitats that the saline factor could not be used to explain the differences in plankton distribution. The cycles of zooplankton production were detd. by collections made during the spring, summer and winter seasons of 1937-1938. By using a closing net it was determined that at 3.5 m., 6.5 m. and at 18.5 m. the vertical distribution of zooplankton was

not uniform. It is significant that 10 m. was the limit for Lamellibranch larvae, the Titinnidae and Rotifera. The net used was suspended by a 4-m. rope and a pole at the side of the boat in such a way that its direction could be controlled as well as the depth of its operation. Catches were made for 75 sec. duration at 5 stations at a boat speed of 2.3 knots. Whenever possible living material was studied and CO₂ capsules were used to anaesthetize the plankters to facilitate observation and identification. In all, 64 spp. of animals were noted, of which 35 were Rotifera, but only 15 (including 8 Rotifera) were abundant enough to be considered biologically productive. The composition of the zooplankton for 1936 and for 1937-1938 is shown graphically in 2 charts in such a way that quantitatively various groups of organisms as well as predominating genera may be compared. In both periods the Rotatoria predominate, with Copepoda and Nauplius stages 2d in abundance. The Cladocera and the Herpacticidae are the least in numbers in both periods. The distribution of some 65 spp. is discussed critically. The plankton could be divided into 3 general groups: Surface forms of outer or shallow water zone (17 spp.); deep water or "grundplankton" (35 spp.); and surface plankton of deep or interior water (15 spp.). Graphs are offered to show the differences between some of the stations in respect to a few organisms of great productivity; e.g., at one station (Sta. 1) *Keratella quadrata* reaches a peak of about 500 organisms per 100 l in July; at station 8 during the same yr. this species reached a peak during June and July of 44,000 organisms per 100 l.—There is a list of 36 literature citations.—G. W. Prescott.

21640. ZIEGELMEIER, ERICH. Die qualitative und quantitative Verteilung des Zooplanktons in einigen grossen Fischteichen der Bartschniederung mit besonderer Berücksichtigung der Cladoceren und Copepoden. *Arch. Hydrobiol.* 36(4): 495-551. 4 pl. 1940.—The author reports on a 2-yr. study of some shallow ponds in the delta of the Bartsch R. near the town of Miltisch. Here, because of the low terrain and the diluvial soil, conditions are ideal for many artificial and natural ponds, where today there are over 200 such in 80 sq. km. These ponds have been used for fishing since ancient times, especially by the monks during the Middle Ages. Today most of them have enough open water, bordered now by only a fringe of emergent vegetation, to make possible the development of a pelagic biota. Six of the ponds were chosen for study, all of them very shallow and ranging in acreage from 27 ha. to 379 ha., the largest being Grabenitz-Teich which is described as the greatest fishing pond of this type in Germany. Av. depths for the respective ponds range from 62 cm to 110 cm. There is a discussion of significant environmental factors such as temp. and precipitation. Weekly temp. readings were made at the time that plankton catches were taken from Apr. to Sept. during 1936 and 1937. A more complete record of temp. changes was obtained by computation from max.-min. thermometer and actinograph readings furnished daily by the local weather bureau. It was noted that in these shallow ponds temp. changes follow very promptly air temp. variations. A graph is included to illustrate the calculated correlation between water and air temps. Quantitative samples of the plankton were taken by a specially designed celluloid tube of 20 l. capacity, the construction of which is illustrated and described. The samples so taken were filtered and made up to 100 ml. standards. A measured portion of the latter was removed by a Hensen piston-pipette and the organisms counted for qualitative and quantitative analyses. 36 Cladocera and 15 Copepods were found and the distribution of significant forms in time and space detd. and expressed graphically in correlation with temperature graphs. There is an expected, although incomplete, similarity in distribution when data for 1936 and 1937 are compared. For most of the 6 ponds *Daphnia pulex* was abundant during Apr. and the early summer, while *D. longispina* was found to be prevalent throughout the period of observation, with peaks and reductions in numbers appearing at irregular intervals. In general, the lakes exhibit a eutrophic type of fauna with differences in qualities significantly related to available nutrients. In ponds where artificial fertilizers were added successions of composition of the fauna and

flora were noted: At first there was a *Bosmina-Cyclops* fauna with phytoplankton scarce or wanting; then there appeared a *Cyclops-Daphnia* population with *Anabaena* and Chlorophycean algae present; this passed to a 3d condition in which *Daphnia* is completely dominant and the phytoplankton is principally *Aphanizomenon flos-aquae*. Increase in the size of the individual zooplankters was accompanied by an expected decrease in numbers.—There is a list of 95 literature citations.—G. W. Prescott.

WILDLIFE MANAGEMENT—AQUATIC

(See also Entries 21608, 23281, 23363, 23364, 23366, 23367)

21641. ALLEN, K. RADWAY. (Fish. Lab., Marine Dept., Wellington, New Zealand.) Comparisons of bottom faunas as sources of available fish food. *Trans. Amer. Fish. Soc.* 71: 275-283. 1941(1942).—To obtain a true estimate of the actual quantity of fish-food which any fauna represents, allowance must be made for the differences in the availability to the fish of the various component species. The theoretical basis of "forage ratio" or "availability ratio" is discussed. Availability factors and apparent available densities can be detd. on a numerical basis. Sufficient samples should be taken to minimize sampling error. Seasonal variation should be considered in taking samples and samples should not be taken too soon after floods.—K. R. Allen.

21642. BROWN, C. J. D., and GERTRUDE C. KAMP. (Michigan Dept. Conserv., Inst. Fish. Res., Ann Arbor.) Gonad measurements and egg counts of brown trout (*Salmo trutta*) from the Madison River, Montana. *Trans. Amer. Fish. Soc.* 71: 195-200. 1941(1942).—Gonad studies were made on 41 ♀ and 15 ♂ brown trout, *Salmo trutta*, from the Madison R., Montana. The left ovary, with some exceptions, was found to be longer and heavier and to produce more eggs than the right. The av. numbers of eggs produced by the right and left ovaries were 589 and 680, respectively (38 fish), and the av. of all eggs per ♀ for fish that were weighed was 1,285 (37 fish). There seemed to be little or no correlation between the length, wt., condition, or age of these ♀♀ and the number of eggs produced. The gonads comprised 1.7% of the body wts. of the ♂♂. The wt. of the testes did not show any correlation with the length, wt., age, or condition of the fish.—C. J. D. Brown.

21643. CARBINE, W. F. (Michigan Inst. Fish. Res.) Observations on the life history of the northern pike, *Esox lucius* L., in Houghton Lake, Michigan. *Trans. Amer. Fish. Soc.* 71: 149-164. 1 fig. 1941(1942).—Male northern pike made up 65% of the 378 adults taken in the upstream weir of the ditches tributary to the north bay of Houghton L. in Apr., 1939. An estimated additional 50 fish moved upstream before the weir was installed. The ♂♂ averaged 21.2 inches, total length; the ♀♀ averaged 23.5 in. In 1940, 58% of the 118 adults were ♂♂. 28 additional spawners (13 ♂♂ and 15 ♀♀) captured outside the exptl. area were later added to the 118 fish. The ♂♂ of the 1940 run averaged 19.8 in. in total length (cf. 23.2 in. for the ♀♀). Most of the spawners appeared in the weir between 6 p.m. and 9 a.m. The av. number of days that the adult northern pike spent in the ditches in 1939 was 18.25 (range, 6-50 days). In 1940 the av. number of days spent in the ditches was 23.9 (range, 4-90 days). The numbers of young northern pike (aside from an insignificant few that were preserved) that entered the downstream weir from the spawning grounds to Houghton L. were: 1939—7,239; 1940—1,495. These young were the offspring of 125 potential ♀ spawners in 1939, and of 65 in 1940. The av. length of the young increased at a rate of at least 1.8 mm. per day during the 82 days after the 1st hatch was observed in 1939, and at least 1.3 mm. per day during the first 85 days after the 1st hatch was observed in 1940.—H. F. Carbine.

21644. EMBODY, DANIEL R. (Cornell U., Ithaca.) A method of measuring the number of ectoparasites infesting hatchery fish, with particular application to *Gyrodactylus*. *Trans. Amer. Fish. Soc.* 71: 122-130. 1941(1942).—A quantitative method is presented for estimating the intensity of infestation of the ectoparasite *Gyrodactylus* on goldfish. When infested fish are immersed in solns. of cresol the *Gyrodactylus* leave the fish and drift about in the liquid. The number of organisms in the soln. may then be counted

by standard methods. A series of expts. was performed to determine the variability in counts of parasites as it might be influenced by the use of several different fish, by different workers making the counts, by variations in the time interval between the immersion and counting, and by the conc. of the cresol. From exptl. evidence obtained, it was concluded that considerable variability was associated with the counts made from different fish. Counts made by different workers and counts made after various immersion times, did not vary significantly. Conc. of 1:4,000 to 1:6,666 (parts cresol: parts water) seemed satisfactory for use with *Gyrodactylus*. The method described is suitable for use with modern exptl. designs and provides a quantitative "yardstick" for judging the effectiveness of various treatments for controlling ectoparasites on fish.—D. R. Embrey.

21645. FRY, F. E. J., et L'ABBE OVILA FOURNIER. Les températures lethales de divers organismes aquatiques du haut Saint-Laurent. *Rev. Canadienne Biol.* 1(1): 103-104. 1942.—The authors reported on work with certain species of fish indigenous to the region of Montreal. Acclimation temps. of the 7 species were established. These fish showed decreasing resistance to high temps. in the following order: *Fundulus diaphanus*, *Ameiurus nebulosus*, *Ambloplites rupestris*, *Catostomus commersonii*, *Lepomis gibbosus*, *Eucalia inconstans* and *Perca flavescens*. These do not show more than 6° difference in lethal temp. The lethal temp. rises 1° for each 3° elevation in acclimation temp.—Ruth Sumner.

21646. HILE, RALPH. (U. S. Dept. Interior, Fish and Wildlife Serv.) Growth of the rock bass, *Ambloplites rupestris* (Rafinesque), in five lakes of northeastern Wisconsin. *Trans. Amer. Fish. Soc.* 71: 131-143. 1941(1942).—The forms of the growth-curves of rock bass from 4 lakes in n.-e. Wisconsin with medium-hard to hard water bore a general resemblance to each other, but differed sharply from the curve for rock bass from a lake with extremely soft water. With the exception of a slight increase in growth in the 3d yr. of life the annual increments of length of the rock bass of Nebish Lake (4 ppm. of bound CO₂) to decrease consistently beyond the 1st yr. The good 1st-yr. growth in length of rock bass of Allequash, Silver, and Trout Lakes (16.8, 15, and 18.7 ppm., respectively, of bound CO₂) was followed by poor growth in the 2d, 3d, and 4th yrs. of life. This poor growth was followed in turn by good growth in the 5th and 6th years. The annual increments of length tended to decline beyond the 6th year of life. The growth of rock bass of Muskelunge Lake (10 ppm. of bound CO₂) declined sharply in the 2d yr. of life. The annual increments of length were fairly constant in the 2d to 7th yrs., inclusive, but declined beyond the 7th yr. In each lake the ♂♂ grew more rapidly than the ♀♀. The time of attainment of the legal total length of 7 in. in the different lakes ranged from late in the 6th growing season in Nebish and Trout Lakes to the middle of the 8th growing season in Muskelunge L. Rock bass of corresponding length from Allequash, Silver, and Trout Lakes were so nearly of the same wt. that one curve described the length-wt. relationship of the 3 stocks. Muskelunge L. rock bass were considerably lighter than fish of the same length from these 3 lakes, and Nebish L. rock bass were somewhat lighter than those from Muskelunge L.—Ralph Hile.

21647. LOOSANOFF, VICTOR L., and JAMES B. ENGLE. (Fishery Biol. Lab., Milford, Conn.) Accumulation and discharge of spawn by oysters living at different depths. *Biol. Bull.* 82(3): 413-422. 1942.—Studies were made on oysters living at 10, 20 and 30-ft. depths of Long Island Sound. Prior to spawning, which occurred at about the same time at all depths, the thickness of the gonadal layer of shallow water oysters was approx. twice that of the animals living at a 30-ft. depth. During the spawning season the shallow water oysters discharged spawn in larger quantities and more rapidly than the oysters of deeper water. Among the oyster population living in shallow water there was a small group of individuals whose spawning was completed within a week. Ripe but unspawned oysters were found in some samples collected as late as 6 weeks after the beginning of the spawning season. Approx. 50% of the oyster population had half its spawn

discharged by Aug. 8. This date, therefore, is considered as the midpoint of the spawning period. The spawning activities were finished about Sept. The shallow water oysters completed their spawning somewhat earlier than those living in deeper water.—V. L. Loosanoff.

21648. NEEDHAM, PAUL R., and FRANK K. SUMNER. (*Stanford U.*) Fish management problems of high western lakes with returns from marked trout planted in Upper Angora Lake, California. *Trans. Amer. Fish. Soc.* 71: 249-269. 2 fig. 1941(1942).—Ecological conditions in high Sierra lakes generally in California are discussed in detail. The standing crop of the bottom foods in Upper Angora Lake averaged 49 lbs. wet wt. per acre. Dominant foods were midges and scuds (*Hyalella*). Midge larvae and pupae formed the dominant foods eaten by trout. Two lots of eastern brook trout (*Salvelinus fontinalis*) were planted, one of small fish averaging about 2 inches long, planted in Sept. 1933, and one of large fish averaging 5½ in. in length, planted in June 1935. Both were marked by removal of fins. Over a 3-yr. period only 4.3% of the 2-in. fish and 25.6% of the 5½-in. fish were reported caught. An examination of scales indicated that most of the eastern brook trout caught were in their 3d year. No rainbow trout <3 yrs. old or brown trout <5 yrs. old were present in the sample studies. Production to anglers' creels was 15.8 lbs. in 1934 and 21.2 lbs. in 1935, and 17 lbs. in 1936. Selective gill-netting operations is presented as a possible conservation measure to reduce predation of large trout where it is undesirable to destroy entire populations by poisons or other means.—P. R. Needham.

21649. RANEY, EDWARD C., and ERNEST A. LACHERER. (*Cornell U., Ithaca*) Autumn food of recently planted young brown trout in small streams of central New York. *Trans. Amer. Fish. Soc.* 71: 106-111. 1941(1942).—Populations of young brown trout, *Salmo trutta* (from 66 to 111 mm. in total length), were sampled during late Aug. to Nov. at known intervals after they had been planted in 2 streams. The stomach contents of 75 were analyzed. Two days after planting, 16 out of 26 stomachs contained some food; 82% by volume was of aquatic origin. Only insects were eaten, and of these Ephemeroptera and Diptera were most important. After 16 days each of 20 stomachs contained food. Aquatic food still predominated (86%), and a large part (93%) was insect. Ephemeroptera and Diptera were still most important, although beetles (Coleoptera) were present to the extent of 21% by volume. Earth worms, Arachnida, and isopods were also eaten. After 42 days, 10 trout were obtained. Aquatic organisms still made up a large part (79%) of the stomach contents. Insects still predominated (86%), and while mayflies (Ephemeroptera) were still most important, Diptera, Orthoptera, Hemiptera and Plecoptera were well represented. The remains of a fish was found in one stomach. In another stream with a slightly different bottom fauna, 20 out of 22 stomachs contained food 3 days after the fish had been planted. Most of the food (95%) was aquatic in origin, and 95% was insect. Diptera and Trichoptera were most important.—E. C. Raney.

21650. STATE BOARD OF FISHERIES AND GAME LAKE AND POND SURVEY UNIT. A fishery survey of important Connecticut lakes. *Bull. Connecticut Geol. and Nat. Hist. Surv.* 63. 1-339. Map, illus. 1942.—The results of and data gathered during an investigation from 1937-1939, the purpose of which was to study the biological, chemical, and physical conditions of 47 Connecticut lakes and ponds, are presented. The paper is composed of an introduction, 4 sections, and an appendix in 5 parts, and is "designed primarily to acquaint sportsmen with the problems involved in the proper management of lakes," but also contains much valuable information for fishery biologists and limnologists. Section I (L. M. THORPE), Management Methods As Applied To Pondfish Restoration, is mainly an outline of the various factors involved in the production of a crop of game fishes. It includes comments on stocking policy, causes of fluctuations in abundance, the philosophy of catch regulations, etc. Section II (E. S. DEEVEY and J. S. BISHOP), Limnology, contains a short description of the salient features of lakes which are important in the study of fish populations, a non-technical account of the procedures involved in a limnological survey,

and an excellent limnological summary which stresses the influence of geology on the productivity of Connecticut lakes. It is shown that the amt. of phytoplankton is controlled by the amt. of total P and N in the lakes and that lakes which are most productive of plankton are also richest in bottom fauna; also the comparative productivity and other features of Connecticut lakes are discussed. Section III (D. A. WEBSTER), The Life Histories of Some Connecticut Fishes, is devoted to a brief but useful and well-illustrated account of 40 spp. (13 introduced) of fishes, in which there are comments on the distribution, reproduction, habits, habitat, and economic importance. Also included are remarks on the food and growth-rate of certain forms. Section IV (G. W. HUNTER, III), Studies On The Parasites Of Fresh-Water Fishes of Connecticut, enumerates some of the general effects of parasitism (blood poisoning, edibility, emaciation, etc.) and discusses some of the economically important parasites, with special attention to those of the common sunfish, calico bass, white perch, smallmouth and largemouth bass, yellow perch, and chain pickerel. More Connecticut fishes are parasitized than those from other states, but they carry fewer spp. of parasites, and it is suggested that the parasitic burden is actually less. Recommendations are included. The Appendices of this bulletin include a summary of the data which has been gathered, as well as recommendations, the past stocking history of the waters which have been investigated, the technical and analytical methods used in the limnological studies, and limnological and ichthyological master sheets.—Daniel Merriman.

WILDLIFE MANAGEMENT—TERRESTRIAL
(See also Entries 21589, 21603, 22721, 22853, 23268, 23401, 23403, 23426, 23427)

21651. DALKE, PAUL D., W. K. CLARK, Jr., and L. J. KORSCHGEN. (*Missouri Cooperative Wildlife Res. Unit.*) Food habit trends of the wild turkey in Missouri as determined by dropping analysis. *Jour. Wildlife Management* 6(3): 237-243. 3 fig. 1942.—Trends in the seasonal food habits are shown to correspond with availability of the different classes of food. Plant foods comprised approx. 75% of the annual subsistence, grass seeds and blades and acorns being most important. Insect foods made up the remaining 25% of the diet, beetles, grasshoppers, and ants comprising nearly ¼ of all the animals eaten.—P. D. Dalke.

21652. EDWARDS, OLIVER T. (*Malheur Nation. Forest, John Day, Oregon.*) Survey of winter deer range, Malheur National Forest, Oregon. *Jour. Wildlife Management* 6(3): 210-220. 2 pl., 3 fig. 1942.—Since 1932 various observers had known of the excess winter use of the forage in Murderers Creek area by mule deer. By 1935 damage was apparent elsewhere. A study was conducted in 1937 and 1938, to determine the limits and extent of the damage and to find possible remedies to correct the situation. The deer winter range lands were of a semi-desert character, supporting such plants as *Artemesia tridentata*, *Cercocarpus ledifolius*, *Juniperus occidentalis* and *Purshia tridentata*. Observations on the size, character, and distribution of the deer herd, the condition of the food plants and other related factors as refuges and competition with livestock were made. The data showed that the more important deer winter range areas were seriously overpopulated; the browse plants were damaged severely and their productivity and carrying capacity greatly reduced; a reduction of the deer herd was essential to prevent further destruction of range and winter death loss of deer; and removal of either livestock or deer from summer range on National Forest would not solve the deer winter range problem.—L. W. Swift.

21653. EKLUND, CARL R. (*Indian Reservation Wildlife Section, Fish and Wildlife Serv., Minneapolis, Minn.*) Ecological and mortality factors affecting the nesting stage of the Chinese Pheasant in the Willamette Valley, Oregon. *Jour. Wildlife Management* 16(3): 225-230. 1942.—In 1937, 145 nest observations showed 55.17% mortality. Nests averaged 10.45 eggs per clutch. 44.83% successful hatches averaged 9.86 chicks. Haying caused greatest loss with 45 nests destroyed. Man, by haying, plowing, disturbing, or removing eggs caused 57 losses. Predators destroyed 12 nests. Flooding and disturbance by other birds and animals

caused 6 losses. Cultivated fields of hay, grain, wild grasses, brush and weeds were the most favored habitats in order indicated. Timber and extensive woodlots were of minor importance. Mowing was the greatest single factor of nest mortality, but more nests were destroyed outside of hay fields as result of combination of other factors. Normal agric. operations, other than grass or grain cutting, were not a major limiting factor. Skunks caused considerable damage and where population is heavy there should be some control; other predators did not warrant control. Heavy rainfall is factor in mortality to pheasant chicks but, except in flooding, probably caused no nest abandonment. Drinking water, hilly or level ground, and shade were not limiting factors, but type of soil was a basic factor in that it controlled vegetative growths.—C. R. Eklund.

21654. ELDER, WILLIAM H., and LYLE K. SOWLS. (U. Wisconsin.) Body weight and sex ratio of cottontail rabbits. *Jour. Wildlife Management* 6(3): 203-207. 1 fig. 1942.—Of 398 cottontail rabbits, *Sylvilagus floridanus mearnsi* about Madison, Wisconsin was the most typical weight class (1,100 to 1,200 grams). All over 1,500 g. were ♀♀, which average significantly heavier than ♂♂. In late winter and early spring ♂♂ show a significant loss in av. wt. but ♀♀ do not; probably their "holing-up" tendency retards wt. loss. Body wt. alone can not be used to separate adults from juveniles for August juveniles often exceed 1,000 g. and many adults in the breeding season do not attain this wt. As the fall progresses testes of juveniles increase in size, while testes of adults decrease until neither size nor wt. will distinguish the 2 age groups. The flaccid testes of adults are a reliable criterion to distinguish them from the turgid testes of immature ♂♂. Placental sites in the uterus of all adult ♀♀ and their absence in juvenile ♀♀ is a reliable method of distinguishing age until Dec. The sex ratio is probably nearly even. Disparity in published findings seems traceable to the methods of capture.—W. H. Elder.

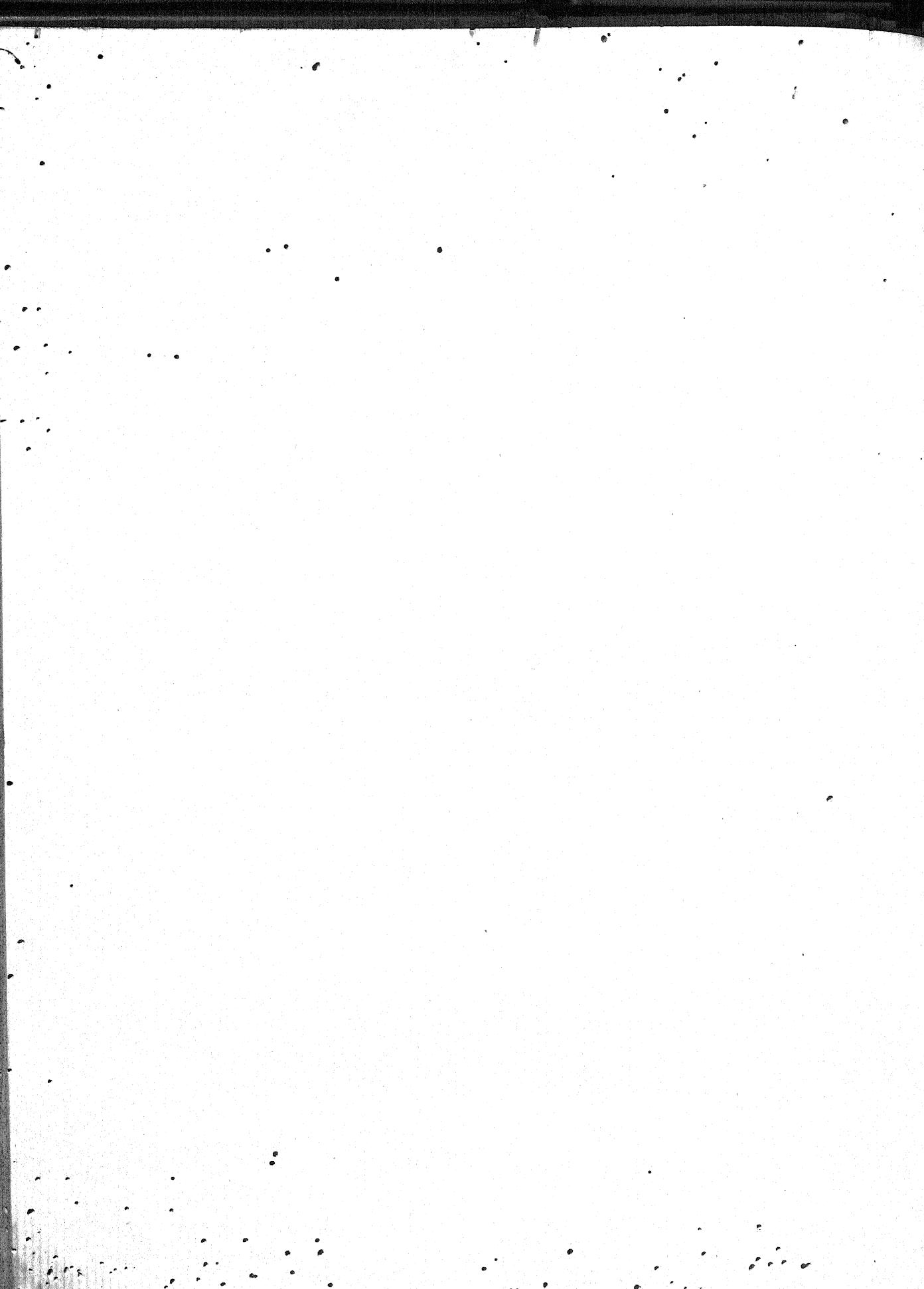
21655. FISHER, LEE W. (Game, Fish and Oyster Comm., Austin, Tex.) Live trapping Texas antelopes. *Jour. Wildlife Management* 6(3): 231-236. 4 pl., 4 fig. 1942.—Antelopes (*Antilocapra americana*) were herded by airplane into a trap of 3 connected pens. The first, 1000 to 1500 ft. long, was of net wire fence 52 inches high with a canvas roll gate; the 2d, of four 50×6 ft. cord nets, narrowed to a third or crowding pen, hexagonal and about 14 ft. in diam., also of cord nets. In the latter 467 animals were caught in 43 days by hand; they were sexed, aged, weighed and ear tagged, then transported in wooden crates on auto trucks and released at distances of 25 to 663 miles for restocking depleted ranges. Only 3 died. The total cost was \$4.30 per animal.—T. I. Storer.

21656. HAUGEN, ARNOLD O. (Michigan Dept. Conserv., Swan Creek Wildlife Exp. Sta.) Home range of the cottontail rabbit. *Ecology* 23(3): 354-367. 1942.—The home range of the cottontail rabbit (*Sylvilagus floridanus mearnsi*) was detd. on wild scrub oak sandy upland in southwestern Michigan during 2 yrs. intensive live-trapping and ear-marking. All trapping was done with the traps set in a grid pattern. The known range sizes were separated by means of a new graphic approach into incomplete and complete ranges. Adult ♀♀ on an average occupied 14 acres during winter and 22.5 acres during the breeding season. Adult ♂♂ seemed to roam over a large area, perhaps 100 acres or more. Both sexes of juvenile rabbits seem to have approx. similar range requirements during fall, between 13 and 15 acres. Breeding ♀♀ occupied home ranges which were rarely trespassed upon by other breeding ♀♀. Ranges of ♂♂ overlapped ranges of ♀♀, or other ♂♂, indiscriminately.—A. O. Haugen.

21657. LAGLER, KARL F. (U. Michigan), and BURTON T. OSTENSON (Michigan State Coll.). Early spring food of the otter in Michigan. *Jour. Wildlife Management* 6(3): 244-254. 3 fig. 1942.—439 otters trapped in northern Michigan in exptl. open seasons during the springs of 1940 and 1941 yielded 173 stomachs and 220 intestines that contained food. The stomach contents (2316.5 ml. of food) were analyzed and showed the following composition by measured volume expressed in %: game and pan fishes, 32; forage fishes, 17.6; fish remains, 3; amphibians, 16.1; other vertebrates, 25.8; insects, 0.8; and crayfishes, 4.7. The intestinal contents gave the following av. estimated percentages by bulk: game and pan fishes, 15.9; forage fishes, 22.7; fish remains, 13.8; amphibians, 7.5; other vertebrates, 0.9; insects, 4.2; and crayfishes, 35. Only 19 trout were present in the 95 stomachs that contained food from otters taken on trout streams. A knowledge of the food of the otter based on stomach-content analyses appears to be much more reliable than that based on examinations of intestinal contents or scats. An annotated list of food items brings out the interactions of predator and prey species and gives substantial information on the biology and ecology of the otter.—K. F. Lagler.

21658. NESTLER, R. B., W. W. BAILEY, and HAROLD E. MCCLURE. (U. S. Dept. Agric., Washington, D. C.) Protein requirements of bobwhite quail chicks for survival, growth and efficiency of feed utilization. *Jour. Wildlife Management* 6(3): 185-193. 5 fig. 1942.—Four experiments involving 816 quail were conducted to determine the protein requirements of bobwhite chicks. From the 3 standpoints of survival, rate of growth, and efficiency of feed utilization for the first 10 weeks of life, the 28% level of protein gave the best results. During the 9th and 10th weeks, the highest efficiency of feed utilization was obtained of the 22% level. The results indicate that after the birds have reached about $\frac{2}{3}$ of their mature wt., the difference in efficiency between a diet containing 28% of protein and one containing 22% may be small enough to justify, in the interest of economy, the use of a diet containing the lower % of protein.—R. B. Nestler.

21659. PEARCE, JOHN, and PERLEY SPAULDING. (Maine Coop. Wildlife Res. Unit.) Plant pathology in relation to northwestern forest wildlife cover. *Jour. Wildlife Management* 6(3): 194-202. 1 pl. 1942.—Planting of food and cover plants for wildlife must be done with due precaution against introduction of new diseases to the locality. Wildlife plantings especially must be watched for the introduction of alternate host plants which may spread destructive rusts and fungi to existing food and cover plants and nearby crops. The significance of these relationships in the management of northeastern (U.S.) forest wildlife cover is discussed. A table of the more important food and cover plants of this region attacked by impairing plant diseases gives the plant, the causative agents of the principal diseases, type of damage sustained, alternate or other hosts, if known, and an arbitrary rating of 1-3 for the seriousness of the disease. The secondary value of plant pathogens to wildlife in supplying food and creating tree cavities adaptable for dens and nests is mentioned. Several practices for minimizing introduction of certain specified plant diseases are given including the use of locally grown stock, planting seed in situ, use of disease resistant spp. or vars., favoring the less susceptible tree spp. in forest stand improvement and use of mixed clonal vegetative vars. The secondary benefits from plant disease organisms sometimes accruing to wildlife in the form of food, and cavities in trees for dens and nests are mentioned.—John Pearce.



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 † Arquivos de Higiene [Rio de Janeiro]
 † Arquivos de Higiene e Saúde Pública
 Arquivos de Zoologia do Estado de São Paulo
 † Arquivos do Museu Bocage [Lisbon]
 Asociación de Ingenieros Agrónomos. Revista [Montevideo] [assigned in part]
 † Asociación Médica Argentina. Revista [Buenos Aires]
 † Asociación Médica de Puerto Rico. Boletín [San Juan]
 Asociación Química Argentina. Anales [Buenos Aires]
 Asociación Cafet. Salvador. Revista. Café de el Salvador
 Association of American Physicians. Transactions [Philadelphia]
 Association of Nervous and Mental Diseases. Research Publications
 † Association of Official Agricultural Chemists. Journal [Menasha, Wis.]
 Association of Official Seed Analysts of North America. Proceedings [New Brunswick]
 Astronomical Society of the Pacific, San Francisco. Publications
 Astrophysica Norvegica [Oslo]
 Athens. Astronomical Observatory. Publications
 Audubon Magazine [New York]
 *† Auk [Lancaster, Pa.]
 * Australasian Antarctic Expedition, Section C. Zoology and Botany [Sydney]
 † Australia. Commonwealth. Council for Scientific and Industrial Research. Journal [Melbourne]
 † Australia. Commonwealth. Council for Scientific and Industrial Research. Pamphlet [Melbourne]
 * Australia. Commonwealth. Forestry Bureau Bulletin
 Australian Chemical Institute. Journal and Proceedings
 Australian Forestry [Sydney]

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† Australian Institute of Agricultural Science. Journal
 * Australian Journal of Experimental Biology and Medical Science [Adelaide]
 * Australian Museum. Records [Sydney]
 † Australian Veterinary Journal [Sydney]
 † Australian Zoologist [Sydney]
 Avicultural Magazine [London]
 † Bacteriological Reviews [Baltimore]
 Balneologe [Berlin]
 Barbados. Department of Science and Agriculture. Agricultural Journal
 * Bartlett Tree Research Laboratories. Bulletin [Stamford]
 Bartonia [Philadelphia]
 Beirut, Syria. Université St. Joseph. Observatoire de Kasara. Annales
 Beiträge zur Biologie der Pflanzen [Berlin]
 † Beiträge zur Fortpflanzungsbiologie der Vögel mit Berücksichtigung der Oologie [Berlin]
 † Beiträge zur geobotanischen Landesaufnahme der Schweiz [Bern]
 Beiträge zur Klinik der Tuberkulose [Berlin]
 Beiträge zur pathologischen Anatomie und zur allgemeinen Pathologie [Jena]
 Beiträge zur Physik der freien Atmosphäre [Leipzig]
 † Berlin-Dahlem. Morphologische und taxonomische Entomologie. Arbeiten
 Berlin-Dahlem. Physiologische und angewandte Entomologie. Arbeiten
 Berlin-Dahlem. Universität. Botanischer Garten und Museum. Notizblatt
 Berliner und münchen tierärztliche Wochenschrift
 *† Bernice Pauahi Bishop Museum. Bulletin [Honolulu]
 *† Bernice Pauahi Bishop Museum. Memoirs
 *† Bernice Pauahi Bishop Museum. Occasional Papers
 * Bernice Pauahi Bishop Museum. Special Publications
 † Better Crops with Plant Food [New York]
 † Better Fruit [Portland, Ore.]
 Bibliographia Biotheoretica
 Bibliographia Genetica [Gravenhage]
 † Bibliotek for Laeger [Copenhagen]
 Biedermann's Zentralblatt für Agrikulturchemie und rationellen Landwirtschaftsbetrieb. Abteilung B. Tierernährung
 Binnengewässer (Thienemann) [Stuttgart]
 * Biochemical Journal [London]
 Biochemische Zeitschrift [Berlin]
 Biochimica e Terapia Sperimentale [Milan]
 Biodynamica
 Biokhimia [Biochemistry]
 Bioklimatische Beiblätter
 Biologe [Munich]
 Biologia Medica [Rio de Janeiro]
 *† Biological Bulletin [Woods Hole, Mass.]
 † Biological Photographic Association. Journal [Waukesha, Wis.]
 Biologicheskii Zhurnal (Journal de Biologie de l'URSS) [Moscow]
 † Biológico [São Paulo]
 Biologisches Zentralblatt [Leipzig]
 * Biometrika [Cambridge, Eng.]
 Bios [Mt. Vernon, Iowa]
 *† Bird-Banding [Boston]
 Black Fox Magazine [New York]
 *† Black Rock Forest, Cornwall-on-the-Hudson, N. Y. Bulletin
 *† Black Rock Forest Papers
 * Bloemfontein, Nasionale Museum. Soölogiese Navorsing
 *† Blumea [Leyden]
 Bodenkunde und Pflanzenernährung
 † Boletim Biológico [São Paulo]
 † Boletim Biológico. Série Monográfica
 † Boletín de Entomología Venezolana [Caracas]
 † Boletín del Laboratorio de la Clínica "Luis Razetti" [Caracas]
 † Boletín de Patología Vegetal y Entomología Agrícola [Madrid]
 Boletín Médica del Hospital General [Mexico]
 † Bombay Natural History Society. Journal
 † Bombay. University. Journal
 † Bonne Terre [Sainte-Anne de la Pocatière, Canada]
 Börgyogy Urol. Vener. Szemle
 Bose Research Institute. Transactions [Calcutta]
 *† Botanical Gazette [Chicago]
 † Botanical Magazine [Tokyo]
 *† Botanical Review [Lancaster, Pa.]
 Botanical Society of Edinburgh. Transactions and Proceedings
 † Botanicheskii Zhurnal SSSR (Journal of Botany USSR) [Leningrad]
 Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie [Leipzig]
 Botanisches Archiv [Leipzig]
 Botanisches Centralblatt. Beihefte. Abteilung A. [Dresden]
 Botanisches Centralblatt. Beihefte. Abteilung B.
 Botanisk Tidsskrift [Stockholm]
 † Botaniska Notiser [Lund]
 † Botany and Zoology (Syokubuto Oyobi Dōbutsu) [Tokyo]
 * Bothalia
 * Boyce Thompson Institute for Plant Research. Contributions [Yonkers, N. Y.]
 Bragania
 Brain [London]
 † Brasil-Medico [Rio de Janeiro]
 Brewers Digest
 Brewers' Journal and Hop and Malt Trades Review
 Brewing Trade Review
 Bristol. University. Agricultural and Horticultural Research Station. Annual Report
 † British Association for the Advancement of Science. Report [London]
 * British, Australian and New Zealand Antarctic Research Expedition Reports. Series B.
 † British Birds [London]
 British Dental Journal [London]
 British East African Meteorological Service. Miscellaneous Publications [Nairobi]
 British Food Journal and Hygienic Review [London]
 † British Golf Unions. Board of Greenkeeping Research. Report [Yorkshire]
 † British Golf Unions. Journal of the Board of Greenkeeping Research [Yorkshire]
 British Journal of Anaesthesia [Manchester]
 † British Journal of Children's Diseases [Dorking]
 British Journal of Experimental Pathology [London]
 British Journal of Ophthalmology [London]
 British Journal of Radiology [London]
 British Journal of Surgery [Bristol]
 British Journal of Tuberculosis [London]
 British Journal of Venereal Diseases [London]
 British Medical Association, Journal of the Malaya Branch [Singapore]
 British Medical Journal [London]
 British Mycological Society. Transactions [Worcester]
 † Brittonia [New York]
 *† Brooklyn Botanic Garden Record
 † Brooklyn Entomological Society. Bulletin [Lancaster, Pa.]
 Brotéria. Série Trimestral: Ciências Naturais
 * Bryologist [Ann Arbor, Mich.]
 † [Buenos Aires] Instituto de Medicina Experimental para el Estudio y Tratamiento del Cáncer. Boletín
 † Buffalo Society of Natural Sciences. Bulletin
 * Buitenzorg, Java. 's Lands Plantentuin (Jardin Botanique de Buitenzorg). Annales
 † Buitenzorg, Java. 's Lands Plantentuin (Jardin Botanique de Buitenzorg). Bulletin
 † Buitenzorg, Java. 's Lands Plantentuin (Jardin Botanique de Buitenzorg). Bulletin. Supplement
 Bulletin of Entomological Research [London]
 † Bulletin of Mathematical Biophysics [Chicago]
 † Bulletin of Sericulture and Silk-Industry (Sanshigaku Zasshi) [Uyeda, Japan]
 Bulletin of the History of Medicine
 Bulletin of the University Hospital [Georgia]
 Bulletins of American Paleontology [Ithaca, N. Y.]
 † Butler University, Indianapolis, Indiana. Botanical Studies
 Cactus and Succulent Journal

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 † Calcutta School of Tropical Medicine and the Carmichael Hospital for Tropical Diseases. Annual Report
 † Caldasia. Boletin del Instituto de Ciencias Naturales [Bogota]
 *† California Agricultural Experiment Station. Bulletin [Berkeley]
 *† California Agricultural Experiment Station. Circular
 *† California Agricultural Experiment Station. Extension Circular
 California and Western Medicine [San Francisco]
 California Avocado Association. Year Book
 California Citrograph [Los Angeles]
 California Cultivator [Los Angeles]
 *† California. Division of Fish and Game. Bureau of Commercial Fisheries. Fish Bulletin [Sacramento]
 * California. Fish and Game [Sacramento]
 California Horticultural Society. Journal
 California Mosquito Control Association. Proceedings
 California. State. Department of Agriculture. Bulletin [Sacramento]
 *† California. University. Publications in Botany
 California. University. Publications in Entomology
 California. University. Publications in Pharmacology
 California. University. Publications in Physiology
 * California. University. Publications in Psychology
 † California. University. Publications in Zoology
 * Cambridge Philosophical Society, Biological Reviews
 *† Canada. Fisheries Research Board of Canada. Bulletin
 Canada. Fisheries Research Board of Canada. Journal [Ottawa]
 Canadian Dairy and Ice Cream Journal [Toronto]
 † Canadian Entomologist [Guelph]
 † Canadian Field-Naturalist [Ottawa]
 Canadian Geographical Journal [Ottawa]
 Canadian Gladiolus Society Annual
 † Canadian Journal of Comparative Medicine [Quebec]
 † Canadian Journal of Research, Section A. Physical Sciences and Section B. Chemical Sciences [Ottawa]
 † Canadian Journal of Research, Section C. Botanical Sciences and Section D. Zoological Sciences
 Canadian Medical Association. Journal [Toronto] [assigned in part]
 Canadian Public Health Journal [Toronto]
 Canberra, Australia. Commonwealth Solar Observatory, Mount Stromlo. Memoirs [Melbourne]
 * Cancer Research [Baltimore]
 † Cane Growers' Quarterly Bulletin. [Bureau of Sugar Experiment Stations Queensland]
 Canner [Chicago]
 Canning Age [New York]
 Canning Trade [Baltimore]
 † Canterbury College, Christchurch, New Zealand. Canterbury Museum. Records
 † Caracas. Ministerio de Sanidad y Asistencia Social. Boletin
 Caracas. Venezuela. Publicaciones de la Division de Malariaologia
 † Cardinal [Sewickley, Pa.]
 † Caribbean Forester [Rio Piedras]
 * Carlsberg Laboratoriet, Copenhagen. Comptes-Rendus des Travaux
 † Carnegie Institution of Washington. Publications
 † Catholic University of America. Biological Laboratory. Contributions [Washington, D. C.]
 Centralblatt für das gesamte Forstwesen [Vienna]
 † C.N.A. Centro Nacional de Agricultura. Revista Agricola [Costa Rica]
 † Centro Asistencial M[edical] E[infermos] P[obres]. La Prensa Medica Mexicana [Mexico]
 *† Cereal Chemistry [Lancaster, Pa.]
 † Ceres [Minas Geraes]
 Certified Milk [New York]
 † Ceylon. Department of Agriculture. Bulletin
 *† Ceylon Journal of Science, Section A. Botany [Colombo]
 † Ceylon Journal of Science, Section B. Zoology and Geology. Spolia Zeylanica
 † Ceylon Journal of Science, Section D. Medical Science
 † Ceylon Journal of Science, Section G. Anthropology
 * Charleston Museum. Contributions [Charleston, S. C.]
 Charleston Museum. Leaflet
 Chat [Raleigh, N. C.]
 Chemical Reviews [Baltimore]
 Chemical Society, London. Journal
 Chemistry and Industry [See Society of Chemical Industry]
 * Chicago Academy of Sciences. Bulletin
 * Chicago Naturalist
 Chile. Facultad de Agronomía. Anales [assigned in part]
 Chile. Museo Nacional. Boletin [Santiago de Chile]
 Chimica e l'Industria
 Chinese Botanical Society. Bulletin [Peiping]
 † Chinese Journal of Physiology [Peiping]
 † Chinese Medical Journal [Peiping]
 † Chronica Botanica [Waltham]
 Chrysanthemum Society of America. Bulletin
 † Ciba Symposia [Summit, N. J.]
 Ciel et Terre [Brussels]
 † Ciencia. Revista Hispano-Americana de Ciencias Puras y Aplicadas [Mexico]
 Citrus Grower [Florida]
 Citrus Industry [Tampa, Fla.]
 *† Cleveland Museum of Natural History. Scientific Publications
 † Clinica Veterinaria [Milan]
 Clinical Science [London]
 † Coimbra, Portugal. Universidade. Folia Anatomica Universitatis Coimbricensis
 † Coimbra, Portugal. Universidade. Museu Zoológico. Memórias e Estudos. Série 1, Zoologia Sistemática
 † Coimbra, Portugal. Universidade. Museu Zoológico. Secção de Biologia e Parasitologia. Arquivos
 Collegium [Frankfurt a.M.]
 Colorado Farm Bulletin
 *† Colorado. University. Studies [Boulder]
 † Colorado. University. Studies. Series D. Physical and Biological Sciences
 Commercial Fertilizer
 † Comparative Psychology Monographs [Baltimore]
 Comptes Rendus (Doklady) de l'Académie des Sciences de l'URSS. Nouvelle Série [assigned in part]
 *† Condor
 Connecticut Pomological Society. Proceedings
 *† Conseil Permanent International pour l'Exploration de la Mer. Journal du Conseil [Copenhagen]
 *† Conseil Permanent International pour l'Exploration de la Mer. Rapports et Procès-Verbaux de Réunions
 † Contributions Toward a Flora of Nevada [Washington, D. C.]
 * Copeia [Ann Arbor]
 * Copenhagen. K. Veterinaer- og Landbohøjskole. Aarskrift
 Cordage Trade Journal
 † Córdoba. Facultad de Ciencias Médicas. Escuela de Farmacia. Archivos
 † Cornell Veterinarian [Ithaca, N. Y.]
 Cotteswold Naturalists' Field Club, Gloucester. Proceedings
 Cranberries
 † Cranbrook Institute of Science, Bloomfield Hills, Michigan. Bulletin
 Current Researches in Anesthesia and Analgesia [Columbus]
 Current Science [Bangalore]
 † Cytologia [Tokyo]
 Daffodil Year-Book [London]
 Dairy Goat Journal [Fairbury, Neb.]
 Dallas Medical Journal
 Dansk Botanisk Arkiv
 Dansk Naturhistorisk Forening i Köbenhavn. Videnskabelige Meddelelser [assigned in part]
 Dansk Ornithologisk Forenings. Tidsskrift [Copenhagen]
 Dansk Skovforening. Tidsskrift [Copenhagen]
 K. Dansk Videnskabernes Selskab Biologiske Meddelelser
 Danzig. Staatliches Observatorium. Forschungsarbeiten
 † Darwinia; Revista del Instituto de Botánica Darwinion [Buenos Aires]
 Date Growers' Institute, Coachella, Calif. Report
 Debrecen. Magyar Kiralyi Gazdasági Akadémiek Munkái

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Denmark. Kommissionen for Videnskabelige Undersøgelse i Grønland. Meddelelser om Grønland

Denmark. Meteorologiske Institut. Communications Magnétiques [Copenhagen]

Dental Record

Dermatologica [Basel]

Dermatologische Wochenschrift [Leipzig]

Desert Plant Life [Pasadena, Calif.]

Deutsche Apotheker-Zeitung

Deutsche botanische Gesellschaft, Berlin. Berichte

Deutsche Forstwirt [Berlin]

Deutsche Gesellschaft für Rassenforschung. Verhandlungen

Deutsche tierärztliche Wochenschrift [Karlsruhe, Hanover]

Deutsche tropenmedizinische Zeitschrift [Leipzig]

Deutsche wissenschaftliche Kommission für Meeresforschung, Berlin. Berichte

Deutsche Zeitschrift für Nervenheilkunde [Leipzig]

Deutsche Zukerindustrie [Berlin]

Deutsches Archiv für klinische Medizin [Leipzig]

* Discovery Reports (Government Dependencies, Falkland Islands)

Diseases of the Nervous System

* Doklady Vsesoyuznoi Akademii S.-Kh. Nauk (Proceedings of the Lenin Academy of Agricultural Sciences of U. S. S. R.) [Moscow]

Dove Marine Laboratory, Cullercoats. Report [assigned in part]

* Dublin. Trinity College. Botanical School. Notes

* Duke University. School of Forestry Bulletin

* Dutch East Indies. Departement van Economische Zaken. Algemeen Proefstation voor den Landbouw. Mededeelingen

* Dutch East Indies. Departement van Economische Zaken Nederlandsch-Indië. Veeartsenijkundige Mededeelingen

* Dutch East Indies. Dienst der Volksgezondheid in Nederlandsch-Indie. Mededeelingen

* Dutch East Indies. Proefstation voor Vorstenlandsche Tabak, Klaten. Mededeeling

* East Malling Research Station. Annual Report

* Ecological Monographs [Durham, N. C.]

* Ecology [Lancaster, Pa.]

Economic Geography [Worcester, Mass.]

* Ecuador. Universidad Central. Anales

Edinburgh Medical Journal

Edinburgh. Royal Botanic Garden. Notes

* Egypt. Ministry of Agriculture. Technical and Scientific Service. Bulletin

Elgin Papers [Illinois]

* Elisha Mitchell Scientific Society. Journal [Chapel Hill, North Carolina]

* Empire Cotton Growing Corporation. Conference on Cotton Growing Problems. Report and Summary of Proceedings [London]

* Empire Cotton Growing Corporation. Progress Reports from Experiment Stations [London]

Empire Cotton Growing Review

* Empire Forestry Journal [London]

Empire Journal of Experimental Agriculture

Emu [Melbourne]

* Endocrinology [Los Angeles]

Endokrinologie [Leipzig]

Entomologica Americana [Brooklyn, N. Y.]

* Entomological News [Philadelphia]

* Entomological Society of America. Annals [Columbus, Ohio]

* Entomological Society of Ontario. Annual Report

* Entomological Society of Southern Africa. Journal

* Entomological Society of Washington. Proceedings [Washington, D. C.]

* Enzymologia [The Hague]

* Eos. Revista Espanola de Entomologia [Madrid]

Ergebnisse der Physiologie [Wiesbaden]

Ernährung der Pflanze [Berlin]

* Fan Memorial Institute of Biology, Peiping, China. Bulletin (Botany)

* Fan Memorial Institute of Biology, Peiping, China. Bulletin (Zoology)

Faraday Society. Transactions [London]

Farm Research [Geneva, N. Y.]

* Farming in South Africa

Fermentforschung [Berlin]

Fette und Seifen

Fiber and Fabric

* Field Museum of Natural History. Botanical Series [Chicago]

* Field Museum of Natural History, Chicago. Publication

* Field Museum of Natural History. Geological Series [Chicago]

* Field Museum of Natural History. Zoological Series [Chicago]

* Finnska Mosskulturföreningens. Arsbok [Helsingfors]

Fisiologia e Medicina [Rome]

* Fiziologicheskii Zhurnal SSSR (Journal of Physiology of USSR) [Leningrad]

Flicker [Minneapolis]

Flora [Jena]

Flore Générale de l'Indochine

* Florida Academy of Sciences. Proceedings [Gainesville]

* Florida Agricultural Experiment Station. Bulletin [Gainesville]

Florida Entomologist

* Florida State Horticultural Society. Proceedings [Tallahassee]

Florists' Exchange [New York]

Florists' Review [Chicago]

Flour and Feed

Folia Anatomica Japonica [Tokyo]

* Folia Clinica et Biologia [São Paulo]

Folia Endocrinologica Japonica [Kyoto]

Folia Haematologica [Leipzig]

* Folia Pharmacologica Japonica [Kyoto]

Food [London]

Food Industries

* Food Research [Champaign, Ill.]

Forest Research in India

Forestry Chronicle [Toronto]

* Foresty [London]

Forêt Québécoise

Forsøgslaboratoriets Beretninger

Forstarchiv: Zeitschrift für wissenschaftlichen und technischen Forstschrift in der Forstwirtschaft

Forstlige Forsøgsvaesen i Danmark

Forstwissenschaftliches Centralblatt

France. Office Scientifique et Technique des Pêches Maritimes. Revue des Travaux

Frankfurter Zeitschrift für Pathologie [Wiesbaden]

Franklin Institute. Journal [Philadelphia]

Fruit Products Journal and American Vinegar Industry [New York]

K. Fysiografiska Sällskapet i Lund. Förhandlingar

* Gaceta Médica de Mexico

Gann [Tokyo]

Gardeners' Chronicle [London]

Gartenbauwissenschaft [Berlin]

Gegenbaurs morphologisches Jahrbuch. Abteilung Jahrbuch für Morphologie und mikroskopische Anatomie [Leipzig]

* Geneeskundig Tijdschrift voor Nederlandsch-Indië [Batavia]

Genetica [Gravenhage]

* Genetics [Menasha, Wis.]

* Genoa. R. Università. Musei e Laboratori di Zoologia Anatomia Comparata. Bollettino

* Gentes Herbarum [Ithaca, N. Y.]

Geobotanische Forschungsinstitut Rübel in Zürich. Bericht

Geobotanisches Institut Rübel, Zürich. Veröffentlichungen

Geological Magazine [London]

Geological Society of Tokyo. Journal

* Germany. Biologische Reichsanstalt für Land- und Forstwirtschaft in Berlin-Dahlem. Arbeiten [assigned in part]

Giornale di Batteriologia e Immunologia [Turin]

* Giornale di Clinica Medica [Bologna]

Giornale di Medicina Militare [Rome]

- † Gladiolus [Boston]
- Gleanings in Bee Culture [Medina, Ohio]
- † Gothenburg. Botanisk Trädgård. Meddelanden
- † Granos [Buenos Aires]
- *† Great Basin Naturalist [Provo, Utah]
- Great Britain. Department of Scientific and Industrial Research. Food Investigation Board. Leaflet
- Great Britain. Department of Scientific and Industrial Research. Food Investigation Board. Special Report
- Great Britain. Imperial Institute. Bulletin [London]
- *† Growth [Menasha, Wis.]
- Guernsey Breeders' Journal
- Guy's Hospital Reports [London]
- Harvard Meteorological Studies
- * Harvard University. Arnold Arboretum. Contributions
- * Harvard University. Arnold Arboretum. Journal
- † Harvard University. Botanical Museum Leaflets
- Harvard University. Museum of Comparative Zoology. Bulletin
- Havana. Colegio de Belén. Observatorio Meteorológico. Miscellaneous Publications
- Havana. Observatorio Nacional. Boletín Oficial
- † Hawaii Agricultural Experiment Station. Bulletin
- Hawaii, Honolulu, University. Occasional Papers
- *† Hawaiian Entomological Society. Proceedings [Honolulu]
- Hawaiian Planters' Record [Honolulu]
- Hedwigia [Dresden]
- Heil- und Gewürzpflanzen
- Helminthological Society of Washington. Proceedings
- Helvetica Chimica Acta [Basel]
- † Helvetica Medica Acta [Basel]
- Helvetica Physica Acta
- † Herba Topiaria [Uitgeest, Holland]
- † Herbertia [Orlando, Fla.]
- Hereditas; Genetiskt Arkiv [Lund]
- * Herpetologica [Chicago]
- Hifukwa Kiyo [See Acta Dermatologica]
- Highland Agricultural Society of Scotland. Transactions [Edinburgh]
- *† Hilgardia [Berkeley, Calif.]
- Hirosima University. Journal of Science. Series B. Div. 1. (Zoology)
- † Hirosima University. Journal of Science. Series B. Div. 2. (Botany)
- † Hokkaido Imperial University. Faculty of Agriculture. Journal [Sapporo]
- Holz- Roh- und Werkstoff
- † Hongkong Horticultural Society. Occasional Notes
- † Hongkong Naturalist
- Hoppe-Seyler's Zeitschrift für physiologische Chemie [Berlin]
- Horticultural Association of Japan. Journal
- † Hospital [Rio de Janeiro]
- Hukuoka Acta Medica (Hukuoka-Ikwadaigaku Zasshi Igaku-Zasshi)
- Hull Bulletins of Marine Ecology
- * Human Biology [Baltimore]
- Human Fertility
- farovizatsiâ (Vernalization)
- Ice and Refrigeration
- Ice Cream Field
- Ice Cream Industry
- Ice Cream Review
- Ice Cream Trade Journal
- *† Idaho Agricultural Experiment Station. Bulletin [Moscow, Idaho]
- † Idaho Forester [Moscow]
- *† Illinois Agricultural Experiment Station. Bulletin [Urbana]
- *† Illinois Agricultural Experiment Station. Science Research Bulletin
- Illinois Medical and Dental Monographs
- † Illinois State Academy of Science. Transactions
- Illinois State Horticultural Society. Transactions
- *† Illinois. State Department of Registration and Education. Illinois Natural History Survey. Biological Notes [Urbana]
- *† Illinois. State Department of Registration and Education. Illinois Natural History Survey. Bulletin
- *† Illinois. State Department of Registration and Education. Illinois Natural History Survey. Circular
- * Illinois. State Department of Registration and Education. Illinois Natural History Survey. Manual
- * Illinois. University. Illinois Biological Monographs
- Imperial Academy of Tokyo. Proceedings
- *† Imperial Agricultural Experiment Station. Journal (Nōji Shiken-Jō Ihō) [Nishigahara, Tokyo]
- Imperial Bureau of Pasture and Forage Crops. Bulletin
- Imperial Bureau of Plant Breeding and Genetics. Bibliographical Monographs [Cambridge, Eng.]
- Imperial Bureau of Plant Breeding and Genetics. Technical Communications [Cambridge, Eng.]
- Incorporated Brewers' Guild. Journal
- India. Meteorological Department. Memoirs [Poona]
- India. Meteorological Department. Scientific Notes [Poona]
- India-Rubber Journal
- † Indian Academy of Sciences. Proceedings. Section A.
- † Indian Academy of Sciences. Proceedings. Section B.
- † Indian Botanical Society. Journal
- Indian Chemical Society. Journal [Calcutta]
- Indian Forest Records [Delhi]
- Indian Forester [Calcutta]
- † Indian Journal of Agricultural Science
- Indian Journal of Entomology [New Delhi]
- * Indian Journal of Medical Research [Calcutta]
- † Indian Journal of Veterinary Science and Animal Husbandry [Delhi]
- * Indian Medical Research Memoirs [Calcutta]
- * Indian Museum. Records
- Indian Science Congress. Proceedings [Calcutta]
- † Indian Tea Association. Scientific Department. Tocklai Experimental Station. Annual Report
- † Indian Tea Association. Tocklai Experimental Station. Memorandum
- † Indian Veterinary Journal
- *† Indiana Academy of Science. Proceedings [Indianapolis]
- Indiana Audubon Society Year Book
- * Indiana University Publications. Science Series
- Industrial and Engineering Chemistry. Analytical Edition
- Industrial and Engineering Chemistry. Industrial Edition [Easton, Pa.]
- Industrial and Engineering Chemistry. News Edition
- † Industrial Equipment News [New York]
- Industrial Medicine [Beloit, Wis.]
- † Institut Pasteur de Tunis. Archives
- Institut Pasteur, Paris. Annales
- † Institut Sérothérapie de l'État Danois. Communications [Copenhagen]
- † Institute for Medical Research, Kuala Lumpur, F. M. S. Bulletins
- † Institute for the Study of Animal Behaviour, Journal. Bulletin of Animal Behaviour [London]
- Institute of Brewing. Journal
- *† Institute of Food Technologists. Food Conference. Proceedings [Champaign]
- Institute of Medicine of Chicago. Proceedings
- † Instituto Adolfo Lutz. Revista [São Paulo]
- † Instituto Bacteriológico de Chile, Santiago. Revista
- † Instituto Bacteriologico del Departamento de Higiene. Revista [Buenos Aires]
- Instituto Benjamin Baptista. Arquivos
- † Instituto Biológico. Arquivos [São Paulo]
- † Instituto Botanico de la Universidad Central. Boletin [Quito, Ecuador]
- Instituto de Butantan. Memorias [São Paulo]
- † Instituto de Defensa del Cafe de Costa Rica. Revista [San José]
- Instituto de Farmacologia e Terapêutica Experimental. Arquivos [Coimbra]
- Instituto de Pesquisas Agronomicas. Archivos [Pernambuco]
- † Instituto de Salubridad y Enfermedades Tropicales. Revista [Mexico]
- † Instituto Fitotécnico de Santa Catalina. Anales
- Instituto Geofísico de Coimbra. Miscellaneous Publications
- Instituto Oswaldo Cruz. Memorias [Rio de Janeiro]
- † Instituto Português de Oncologia. Boletim
- † Institut Pasteur d'Indochine. Archives [Saigon]

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- *† Institutum Divi Thomae. Studies [Cincinnati]
 - Instruments [Pittsburgh]
 - International Aerological Commission. Publications
 - International Association of Milk Dealers. Association Bulletin [Detroit]
 - International College of Surgeons. Journal
- * International Game Fish Association. Ichthyological Contributions [New York]
- † International Journal of Leprosy [Manila]
- † International Review of Agriculture. Monthly Bulletin of Agricultural Science and Practice [Rome]
- International Seed Testing Association. Proceedings
- International Sugar Journal [London]
- Iowa Academy of Sciences. Proceedings [Des Moines]
- *† Iowa Agricultural Experiment Station. Research Bulletin [Ames]
- † Iowa Bird-Life [Winthrop]
- *† Iowa State College Journal of Science [Ames]
- Iowa State Horticultural Society. Transactions
- † Iowa University Studies in Child Welfare [Iowa City]
- * Iowa University Studies in Natural History [Iowa City]
 - Irish Journal of Medical Science [Dublin]
 - Ist. Carlo Forlanini. Annali
- † Istituto di Sanità Pubblica. Rendiconti [Rome]
- † Istituto Sieroterapico Milanese. Bollettino
- † Italia Agricola [Rome]
- Izvestia Akademii Nauk SSSR. Otdelenie Matematicheskikh i Estestvennykh Nauk. Seria Biol. (Bulletin de l'Academie des Sciences de l'URSS. Classe des Sciences Mathématiques et Naturelles. Serie Biologie)
- Izvestia Gosudarstvennogo Russkogo Geograficheskogo Obschestva. (Izvestia de la Société Russe de Géographie) [Leningrad]
- † Izvestia Nauchnogo Instituta Imeni P. F. Lesgafeta (Bulletin de l'Institut Scientifique P. F. Lesshaft)
- Jack-Pine Warbler [Battle Creek, Mich.]
- Jahrbücher für wissenschaftliche Botanik [Leipzig]
- Jamaica Agricultural Society. Journal [Kingston]
- † Jamaica. Department of Science and Agriculture. Annual Report
- *† Jamaica. Department of Science and Agriculture. Bulletin
- Jamaica Weather Service. Publications [Kingston]
- Jamaica Weather Service. Reports [Kingston]
- † Japanese Journal of Botany [Tokyo]
- † Japanese Journal of Experimental Medicine [Tokyo]
- † Japanese Journal of Gastroenterology
- Japanese Journal of Genetics
- † Japanese Journal of Medical Sciences. I. Anatomy [Tokyo]
- † Japanese Journal of Medical Sciences. II. Biochemistry [Tokyo]
- † Japanese Journal of Medical Sciences. IV. Pharmacology
- † Japanese Journal of Medical Sciences. V. Pathology
- † Japanese Journal of Medical Sciences. VI. Bacteriology and Parasitology [Tokyo]
- † Japanese Journal of Medical Sciences. VIII. Internal Medicine, Pediatrics and Psychiatry
- Japanese Journal of Veterinary Science
- † Japanese Journal of Zoology
- Japanese Society of Scientific Fisheries, Tokyo. Bulletin Jassy. Université. Annales Scientifiques
- Jenaische Zeitschrift für Naturwissenschaft
- † Johns Hopkins Hospital. Bulletin [Baltimore]
- † Jornal de Agronomia [São Paulo]
- Journal für Ornithologie [Leipzig]
- Journal Forestier Suisse
- *† Journal of Agricultural Research [Washington, D. C.]
- Journal of Agricultural Science
- † Journal of Allergy [St. Louis]
- * Journal of Anatomy [London]
- Journal of Animal Ecology
- * Journal of Animal Science [Menasha, Wis.]
- Journal of Applied Physics
- Journal of Aviation Medicine [Baltimore]
- *† Journal of Bacteriology [Baltimore]
- Journal of Bacteriology [Japan]
- Journal of Biochemistry [Tokyo]
- *† Journal of Biological Chemistry [Baltimore]
- Journal of Bone and Joint Surgery [Boston]
- Journal of Botany [London]
- Journal of Cellular and Comparative Physiology [Philadelphia]
- Journal of Chemical Education [Chicago]
- * Journal of Clinical Endocrinology [Springfield, Ill.]
- * Journal of Clinical Investigation [New York]
- Journal of Comparative Neurology [Philadelphia]
- Journal of Comparative Pathology and Therapeutics [London]
- † Journal of Comparative Psychology [Baltimore]
- Journal of Constitutional Medicine
- Journal of Dairy Research
- *† Journal of Dairy Science [Columbus, Ohio]
- * Journal of Dental Research [Baltimore]
- † Journal of Documentary Reproduction [Chicago]
- * Journal of Ecology [London]
- *† Journal of Economic Entomology [Menasha, Wis.]
- *† Journal of Endocrinology [London]
- † Journal of Entomology and Zoology [Menasha, Wis.]
- Journal of Experimental Biology [London]
- *† Journal of Experimental Medicine [Baltimore]
- * Journal of Experimental Psychology [Columbus, Ohio]
- Journal of Experimental Zoology [Philadelphia]
- Journal of Forestry [Washington, D. C.]
- *† Journal of General Physiology [Baltimore]
- † Journal of General Psychology [Provincetown, Mass.]
- Journal of Genetic Psychology [See Pedagogical Seminary]
- Journal of Genetics [London]
- Journal of Geography [Lancaster, Pa.]
- Journal of Geology [Chicago]
- Journal of Helminthology [St. Albans, Eng.]
- * Journal of Heredity [Washington, D. C.]
- Journal of Home Economics [Baltimore]
- Journal of Hygiene [London]
- *† Journal of Immunology [Baltimore]
- Journal of Industrial Hygiene and Toxicology [Baltimore]
- * Journal of Infectious Diseases [Chicago]
- *† Journal of Investigative Dermatology [Baltimore]
- Journal of Japanese Botany
- Journal of Laboratory and Clinical Medicine [St. Louis]
- Journal of Laryngology and Otology [London]
- * Journal of Mammalogy
- * Journal of Marine Research [New Haven]
- Journal of Medicine [Cincinnati]
- Journal of Milk Technology [Albany, N. Y.]
- Journal of Morphology [Philadelphia]
- Journal of Nervous and Mental Disease [New York]
- * Journal of Neurophysiology [Springfield, Ill.]
- Journal of Nutrition [Philadelphia]
- Journal of Obstetrics and Gynaecology of the British Empire [London]
- Journal of Organic Chemistry [Chicago]
- * Journal of Paleontology [Lawrence, Kans.; Washington, D. C.]
- *† Journal of Parasitology [Lancaster, Pa.]
- *† Journal of Pathology and Bacteriology [Edinburgh]
- Journal of Pediatrics [St. Louis]
- *† Journal of Pharmacology and Experimental Therapeutics [Baltimore]
- Journal of Philosophy
- Journal of Physical Chemistry [Baltimore]
- Journal of Physiology [London]
- † Journal of Pomology and Horticultural Science [London]
- Journal of the History of Ideas
- Journal of the Science of Soil and Manure [Tokyo]
- Journal of Scientific Instruments [London]
- Journal of South African Botany
- * Journal of Speech Disorders
- * Journal of Technical Methods and Bulletin of the International Association of Medical Museums [Montreal]
- Journal of Thoracic Surgery
- Journal of Tropical Medicine and Hygiene [London]
- Journal of Urology [Baltimore]
- *† Journal of Wildlife Management [Menasha, Wis.]
- Justus Liebigs Annalen der Chemie [Leipzig]
- † Kansas Academy of Science. Transactions
- † Kansas Entomological Society. Journal [Manhattan]
- Kansas State Horticultural Society. Biennial Report

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Kansas. University. State Geological Survey. Bulletin [Lawrence]

Kentucky Academy of Science. Transactions [Lexington]

*† Kentucky Agricultural Experiment Station. Annual Report [Lexington]

*† Kentucky Agricultural Experiment Station. Bulletin

*† Kentucky Agricultural Experiment Station. Circular

Kew. Royal Botanic Gardens. Bulletin of Miscellaneous Information

† Kisérletügyi Kőzlemények [Budapest]

† Kitasato Archives of Experimental Medicine

† Koloniaal Instituut te Amsterdam. Bulletin Kühn-Archiv

Kumamoto Igaku Kwai Zasshi (Kumamoto Medical Society. Journal)

† Kyoto. Imperial University. College of Agriculture. Memoirs

† Kyoto, Japan. Imperial University. Anatomical Institute. Arbeiten. Series D.

† Kyoto, Japan. Imperial University. College of Medicine. Acta Scholae Medicinalis Universitatis Imperialis in Kioto

† Kyoto, Japan. Imperial University. College of Science. Memoirs. Series B

*† Kyushu Imperial University. Journal of the Department of Agriculture

† Laboratory and Medical Progress [Cairo]

Lait [Lyon]

Lancet [London]

Landbouw [Buitenzorg]

Landwirtschaftliche Jahrbücher [Berlin] [assigned in part]

Landwirtschaftliches Jahrbuch der Schweiz [Bern]

† Lantbrukshögskolans Annaler [Uppsala]

La Plata. Museo de La Plata. Notas

La Plata. Museo de La Plata. Revista [assigned in part]

† La Plata. Universidad Nacional. Facultad de Agronomía. Revista

Latvia. State Meteorological Bureau. Numbered Papers [Riga]

† Latvijas Mežu Petišanas Stacijas Raksti

Lauksaimniecības izmēģinajumu un pētījumu žurnāls (Latvian Journal of Agricultural Research)

Leaflets of Western Botany [San Francisco]

† League of Nations. Bulletin of the Health Organization [Geneva]

Leather World [London]

Leningrad. Central Geophysical Observatory. Transactions

Leningrad. Commission Actinométrique Permanente. Bulletin

† Leningradskii Gosudarstvennyi Pedagogicheskii. Uchenye Zapiski (Herzen State Pedagogical Institute. Scientific Memoirs) [Leningrad]

Lettlandische Universität. Meteorologisches Institut. Arbeiten [Riga]

Leyden. Rijks Museum van Natuurlijke Historie. Zoologische Mededeelingen

† Lilloa [Tucumán]

† Lingnan Science Journal [Canton, China]

Linnaean Society of New York. Transactions

* Linnean Society of London. Journal. Botany

* Linnean Society of London. Journal. Zoology

* Linnean Society of New South Wales. Proceedings [Sydney]

* Liverpool Biological Society. Proceedings and Transactions

* Lloydia [Cincinnati]

Los Angeles Neurological Society. Bulletin

Lotta Contra la Tubercolosi [Rome]

† Lues [Kyoto]

Maanedsskrift for Dyrlaeger [Copenhagen]

Maataloustieteellinen Aikakauskirja [Helsingfors]

† Madras Agricultural Journal [Coimbatore, South India]

*† Madras. Government Museum. Bulletin. Natural History Section

* Madroño [San Francisco]

Magyar Biológiai Kutatóintézet, Munkai (Ungarisches biologisches Forschungsinstitut. Arbeiten)

Magyar Orvosi Archivium [Budapest]

*† Maine Agricultural Experiment Station. Bulletin [Orono]

Malacological Society of London. Proceedings

* Malaria Institute of India. Journal [Calcutta]

* Malay States. Federated Malay States. Museums. Journal

† Malayan Agricultural Journal

† Malayan Forester [Kuala Lumpur]

Malayan Meteorological Service. Memoirs [Singapore]

Malayan Nature Journal

Man [London]

Manila Observatory. Publications

*† Marine Biological Association of the United Kingdom. Journal [Plymouth, Eng.]

Martinique. Gouvernement. Service Météorologique et Observatoire Géophysique. Bulletin Annuel [Fort de France]

Maryland State Horticultural Society. Proceedings of the Annual Meeting

*† Massachusetts Agricultural Experiment Station. Bulletin [Amherst]

* Mayo Clinic. Proceedings of the Staff Meetings

Medical Annals of the District of Columbia

Medical Association of Georgia. Journal [Augusta]

† Medicina [Buenos Aires]

Medicina del Lavoro

† Medicina. Revista Mexicana

† Medicina Sperimentale Archivio Italiano [Torino]

Medicine [Baltimore]

† Meditsinskaja Parazitologija i Parazitarnye Bolezni (Medical Parasitology and Parasitic Diseases) [Moscow]

* Melbourne. National Museum. Memoirs

Memphis Medical Journal

† Merck's Jahresbericht

Metron

[Mexico] Departamento Forestal y de Caza y Pesca. Boletin

Mexico. Escuela Nacional de Ciencias Biológicas. Anales Mexico. Universidad Nacional. Instituto de Biología. Anales

Mezőgazdasági Kutatások [Budapest]

*† Michigan Academy of Science, Arts and Letters. Papers [Ann Arbor]

† Michigan Agricultural Experiment Station. Quarterly Bulletin [East Lansing]

Michigan State College Veterinarian [East Lansing]

* Michigan. University. Herbarium. Contributions

*† Michigan. University. Institute for Fisheries Research. Bulletin [Ann Arbor]

* Michigan. University. Laboratory of Vertebrate Genetics. Contributions

*† Michigan. University. Museum of Paleontology. Contributions

* Michigan. University. Museum of Zoology. Miscellaneous Publications

* Michigan. University. Museum of Zoology. Occasional Papers

*† Michigan. University. School of Forestry and Conservation. Bulletin

*† Michigan. University. School of Forestry and Conservation. Circular

Microentomology

Migrant [Nashville]

† Mikrobiologicheskii Zhurnal Akademii Nauk URSR (Journal of Microbiology, Academy of Sciences RSS Ukraine)

Mikrochim. Acta

† Milbank Memorial Fund. Quarterly [New York]

Milchwirtschaftliche Forschungen [Berlin]

† Military Surgeon [Washington, D. C.]

Milk Dealer [Milwaukee]

Milk Plant Monthly

Mind [London]

Mineralogical Magazine [London]

Minerva Medica [Turin]

* Minnesota Academy of Science. Proceedings

Minnesota Agricultural Experiment Station. Bulletin [St. Paul]

Minnesota Agricultural Experiment Station. Miscellaneous Papers

† Minnesota Agricultural Experiment Station. Technical Bulletin
 Minnesota Medicine [St. Paul]
 Missouri Academy of Science. Proceedings
 * Missouri Agricultural Experiment Station. Research Bulletin
 † Missouri Botanical Garden. Annals [St. Louis]
 Missouri State Medical Association. Journal [St. Louis]
 Mitteilungen aus Forstwirtschaft und Forstwissenschaft
 Miyazaki, Japan. College of Agriculture and Forestry. Bulletin
 Modern Brewery Age
 Monatsschrift für Geburtschütze und Gynäkologie [Berlin]
 Monatsschrift für Kinderheilkunde [Leipzig]
 Monitore Zoologico Italiano [Florence]
 Montevideo. Anales de la Facultad de Medicina
 Montevideo. Universidad. Facultad de Agronomía. Revista
 * Montreal. Université de Montréal. Laboratoire de Botanique. Contributions
 Moscow. W. A. Michelson's meteorologisches Observatorium. Berichte
 Mount Sinai Hospital. Journal [New York]
 Mount Washington Observatory. News Bulletin [Exeter]
 † Murelet [Seattle]
 Museo Argentino de Ciencias Naturales. Anales [assigned in part]
 † Museo de Historia Natural "Javier Prado." Boletín [Lima]
 † Muséum d'Histoire Naturelle de Marseille. Bulletin
 * Mycologia [New York]
 Mycopathologica [The Hague] [assigned in part]
 † National Academy of Sciences of India. Proceedings
 † National Academy of Sciences of U. S. A. Proceedings
 † National Butter and Cheese Journal [Milwaukee]
 * † National Cancer Institute. Journal [Bethesda, Md.]
 National Fertilizer Association. Proceedings
 National Formulary Bulletin
 † National Institute of Agricultural Botany. Journal [Cambridge, Eng.]
 * National Joint Committee on Fertilizer Application. Proceedings of the Annual Meeting
 National Museum of Canada. Bulletin
 National Shade Tree Conference, U. S. A. Proceedings and Annual Meeting
 National Wool Grower
 † Natura [Milan]
 † Natural History Society of Formosa. Transactions [Taihoku]
 † Naturaliste Canadien [Quebec]
 Nature [London]
 † Natura och Vi [Lund]
 Naturforschende Gesellschaft zu Basel. Verhandlungen
 Naturwissenschaftliche Untersuchungen des Sarekgebirges in Schwedisch-Lappland
 † Naturwissenschaftlicher Verein für Schleswig-Holstein. Schriften [Kiel]
 † Natuurwetenschappelijk Tijdschrift [Antwerp]
 † Natuurwetenschappelijk Tijdschrift voor Nederlandse Indië [Buitenzorg]
 Nautilus [Philadelphia]
 Nebraska State Medical Journal [Omaha]
 Nebraska. University. Conservation Bulletin [Lincoln]
 Nederlandse Boschbouw-Tijdschrift
 † Nederlandse Indische Bladen voor Diergeneeskunde [Batavia]
 Nederlandse Tijdschrift voor Geneeskunde [Haarlem]
 Nederlandse botanische Vereeniging, Amsterdam. Nederlandse Kruidkundig Archief
 * Nederlandse botanische Vereeniging, Amsterdam. Recueil des Travaux Botaniques Néerlandais
 † Nederlandse Dendrologische Vereeniging. Jaarboek [Wageningen]
 † New England Journal of Medicine [Boston]
 † New England Naturalist [Boston]
 New Flora and Silva [London]
 † New Guinea Agricultural Gazette
 * † New Hampshire Agricultural Experiment Station. Bulletin [Durham]
 New Hampshire Horticultural Society. Annual Meeting
 New Hampshire Horticultural Society. Journal
 † New Jersey Agricultural Experiment Station. Bulletin [New Brunswick]
 * † New Mexico. University. Bulletin. Biological Series
 New Orleans Medical and Surgical Journal
 * New Phytologist [London]
 * New South Wales National Herbarium. Contributions [Sydney]
 * New York Academy of Medicine. Bulletin
 * † New York Academy of Sciences. Annals
 † New York Academy of Sciences. Transactions
 † New York Botanical Garden. Journal
 * † [New York] Cornell University Agricultural Experiment Station. Bulletin
 * † [New York] Cornell University Agricultural Experiment Station. Memoirs
 * New York Entomological Society. Journal
 New York State. Department of Labor. Industrial Bulletin
 * † New York State [Geneva] Agricultural Experiment Station. Bulletin
 * † New York State [Geneva] Agricultural Experiment Station. Technical Bulletin
 New York State Journal of Medicine
 † New York State Museum. Circular [Albany]
 * † New York State Museum. Handbook
 New Zealand Journal of Agriculture [Wellington]
 New Zealand Journal of Forestry
 † New Zealand Journal of Science and Technology [Wellington]
 * New Zealand. Marine Department. Fisheries Bulletin [Wellington]
 Nippon Nōgeikagaku Kaisi [See Agricultural Chemical Society of Japan. Journal]
 Nippon Shokubutsu Aigokwai. Byo-chu-gai Zasshi (Journal of Plant Protection) [Tokyo]
 Nōji-Shiken-Jō Ihō [See Imperial Agricultural Experiment Station. Journal]
 † Nordisk Medicin
 Norsk Veterinaer-Tidsskrift
 † Norske Videnskaps-Akademis i Oslo. Hvalrådets Skrifter [Oslo]
 North American Flora [New York]
 North American Veterinarian [Chicago]
 * North American Wildlife Conference. Transactions
 Northern Nut Growers Association. Report [Ithaca, N. Y.]
 † Northwest Science [Cheney, Washington]
 Northwestern Miller [Minneapolis]
 Notulae Naturae [Philadelphia]
 † Nova-Goa. Escola Médico-Cirúrgica. Arquivos. Série A
 * Novitates Zoologicae [London]
 † Novyi Khirurgicheskiy Arkhiv
 † Nyasaland Agricultural Quarterly Journal [Blantyre]
 Obst- und Gemüsebau [Berlin]
 Oesterreichische botanische Zeitschrift [Vienna]
 Oesterreichische Vierteljahrsschrift für Forstwesen
 † Ohio Agricultural Experiment Station. Bimonthly Bulletin [Wooster]
 * † Ohio Journal of Science [Columbus, Ohio]
 Ohio State Horticultural Society. Proceedings
 * † Ohio State University Bulletin. Ohio Biological Survey Bulletin
 Oil and Soap
 † Okayama. Medizinische Fakultät. Arbeiten
 * Oklahoma Academy of Science. Proceedings
 * Oklahoma Agricultural Experiment Station. Publications [Stillwater]
 * † Oklahoma University. Biological Survey. Publications [Norman]
 Ophthalmological Society of the United Kingdom. Transactions
 Optical Society of America. Journal [New York]
 Orchid Review [Richmond, Eng.]
 * Oregon State Horticultural Society. Annual Report
 † Oriole [Atlanta]
 † Ormoni [Turin]
 † Ornis Fennica [Helsingfors]
 † Ornithologische Beobachter [Bern]
 Orvosi Hétílap

PERIODICALS AND SERIALS COVERED IN BIOLOGICAL ABSTRACTS

Oslo. Universitet. Observatoriet. Meteorologische Beobachtungen

† Osmania University. Journal [Deccan, India]

† Ostrich [Pretoria]

Ovoshchेवодство (U.S.S.R.)

Pacific Pulp and Paper Industry [Seattle]

Pacific Rural Press

Palaeontographica [Munich]

Palaeontographica Americana [Ithaca, N. Y.]

Palaeontographia Italica

† Palao Tropical Biological Station Studies [Tokyo]

Pan-Pacific Entomologist

Paper Industry and Paper World

Paper Trade Journal [New York]

* Parasitology [London]

† Pathologica [Genoa]

Peanut Journal and Nut World [Suffolk, Va.]

Pedagogical Seminary and Journal of Genetic Psychology [Provincetown, Mass.]

† Pediatrisch [Moscow]

* Pennsylvania Academy of Science. Proceedings [Harrisburg]

Pennsylvania Medical Journal

Pennsylvania State Horticultural Association News [State College]

Pennsylvania State Horticultural Association. Proceedings [State College]

Pennsylvania. University. School of Veterinary Medicine. Veterinary Extension Quarterly

† Peru. Ministerio de Fomento. Direccion de Agricultura y Ganaderia. Boletin [Lima]

† Peru. Ministerio de Fomento Direccion de Agricultura y Ganaderia. Circular [Lima]

Peru. Servicio Meteorologico. Miscellaneous Papers [Lima]

† Pests and Their Control [Kansas City]

Pflanzenbau [Leipzig]

Pflügers Archiv für die gesamte Physiologie des Menschen und der Tiere [Berlin]

Pharmaceutical Archives

Pharmaceutical Society of Japan. Journal (Yakukakuzasshi) [Tokyo]

Philippine Agriculturist

Philippine Journal of Agriculture

Philippine Journal of Animal Industry

Philippine Journal of Forestry [Manila]

† Philippine Journal of Science [Manila]

Philippines. National Research Council. Bulletin [Manila]

Philosophic Quarterly [India]

Philosophy of Science

Physical Society of London. Proceedings

Physikalische Zeitschrift [Leipzig]

Physiological Reviews [Baltimore]

*† Physiological Zoology [Chicago]

Physis [Buenos Aires] [assigned in part]

Phytologia [New York]

Phytopathological Society of Japan. Annals [Tokyo]

*† Phytopathology [Lancaster, Pa.]

Pilze Mitteleuropas [Leipzig]

*† Plant Physiology [Lancaster, Pa.]

Planta [Berlin]

Pochvovedenie (Pedology) [Moscow]

Pomological and Fruit Growing Society of the Province of Quebec. Annual Report

*† Poultry Science [Menasha, Wis.]

Prensa Medica Argentina [Buenos Aires]

Problems of Paleontology [Moscow]

Problemy Zhivotnovodstva [Problems of Animal Husbandry]

† Profilassi [Milan]

Progressive Fish Culturist

Protoplasma [Berlin]

† Protoplasma-Monographien [Berlin]

*† Psyche [Cambridge, Mass.]

Psychological Monographs [Princeton, N. J.]

Psychometrica

Psychosomatic Medicine

Publicaciones del Departamento de Medicina Experimental [Santiago]

*† Puerto Rico. Agricultural Experiment Station. Research Bulletin [Rio Piedras]

* Puerto Rico Journal of Public Health and Tropical Medicine [San Juan]

† Puerto Rico. University. Journal of Agriculture

† Puget Sound. College. Department of Biology. Occasional Papers [Tacoma]

Pulp and Paper Magazine of Canada [Gardenvale]

Punjab Forest Records

*† Quarterly Journal of Experimental Physiology [London]

† Quarterly Journal of Forestry [London]

Quarterly Journal of Medicine [London]

† Quarterly Journal of Microscopical Science [London]

† Quarterly Journal of Pharmacy and Pharmacology [London]

Quarterly Journal of Speech [Chicago]

*† Quarterly Journal of Studies on Alcohol [New Haven, Conn.]

* Quarterly Review of Biology [Baltimore]

Québec. Province de. Ministère des Terres et Forêts, de la Chasse et de la Peche. Service d'Entomologie. Contribution

Queensland Agricultural Journal [Brisbane]

† Queensland Naturalist [Brisbane]

Quick Frozen Foods [New Haven]

† Radiology [St. Paul]

† Raffles Museum. Singapore. Bulletin

Rancho Santa Ana Botanical Garden. Occasional Papers

† Rassegna di Clinica, Terapia e Scienze Affini [Rome]

Rassegna di Medicina Applicata al Lavoro Industriale [Turin]

* Reading Museum. Scientific Publications

† Recife. Faculdade de Medicina. Anais [Pernambuco]

† Records of Oceanographic Works in Japan

Records of the Malaria Survey of India [See Malaria Institute of India. Journal]

Recueil des Travaux Botaniques Néerlandais [See Nederlandse botanische Vereeniging]

Refrigerating Engineering

Repertorium Specierum Novarum Regni Vegetabilis [Berlin]

Review of Gastroenterology

Review of Scientific Instruments [New York]

*† Revista Agronomica [Lisbon]

† Revista Argentina de Agronomía

Revista Argentina de Cardiología

† Revista Brasileira de Biología [Rio de Janeiro]

† Revista Chilena de Higiene y Medicina Preventiva [Santiago]

† Revista Chilena de Historia Natural. Pura y Aplicada [Santiago]

Revista Científica de Costa Rica

† Revista da Flora Medicinal [Rio de Janeiro]

† Revista de Agricultura, Industria y Comercio de Puerto Rico

Revista de Agricultura [Piracicaba]

Revista de Agricultura [San José]

† Revista de Biología e Higiene [São Paulo]

Revista de Biología e Medicina [São Paulo]

Revista de Entomología [Rio de Janeiro]

† Revista de Higiene e Saúde Pública [Rio de Janeiro]

† Revista de Industria Animal [São Paulo]

† Revista de Medicina Tropical y Parasitología Bacteriología, Clínica y Laboratorio [Havana]

† Revista de Medicina Veterinaria [Buenos Aires]

† Revista de Medicina Veterinaria y Parasitología [Caracas]

Revista de Sanidad e Higiene Pública [Madrid]

Revista do Museu Paulista [São Paulo]

Revista Farmacéutica [Buenos Aires]

Revista Filipina de Medicina y Farmacia [Manila]

† Revista Industrial y Agrícola de Tucumán

† Revista Médica Municipal [Rio de Janeiro]

† Revista Médica [San José]

Revista Médico-Cirúrgica do Brasil [Rio de Janeiro]

Revista Médico Quirúrgica de Oriente [Santiago de Cuba]

† Revista Mensual B. A. P. [Buenos Aires]

Revista Mexicana de Tuberculosis

† Revista Neurologica de Buenos Aires

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Revista Odontologica [Recife]
 Revista Pădurilor [Bucharest]
 † Revista Sud-Americana de Endocrinologia, Immunologia, y Quimioterapia [Buenos Aires]
 † Revista Universitaria [Cuzco]
 † Revista Zootécnica [Buenos Aires]
 † Revue Agricole de l'île Maurice [Port-Louis]
 † Revue Belge des Sciences Médicales [Louvain]
 † Revue Canadienne de Biologie [Montreal]
 † Revue d'Oké: Agronomie, Médecine, Vétérinaire
 † Revue Générale de Botanique [Paris]
 Revue Suisse de Zoologie
 Rhodora [Boston]
 † Rio de Janeiro. Ministerio da Agricultura. Boletim
 † Risicoltura
 † Rivista di Biologia Coloniale [Rome]
 † Rivista di Malariologia [Rome]
 † Rivista di Parassitologia [Rome]
 Rivista di Patologia Vegetale
 Rivista di Zootecnia [Florence]
 Rivista Forestale Italiana [Rome]
 † Rodriguesia [Rio de Janeiro]
 † Rome. R. Stazione di Patologia Vegetale. Bollettino
 *† Roosevelt Wild Life Annals [Syracuse]
 *† Roosevelt Wild Life Bulletin
 Royal Army Medical Corps. Journal [London]
 Royal Army Veterinary Corps. Journal
 Royal Canadian Institute. Transactions [Toronto]
 † Royal Dublin Society. Scientific Proceedings
 Royal Entomological Society of London. Proceedings. Series A.
 Royal Entomological Society of London. Transactions
 Royal Microscopical Society. Journal [London]
 Royal Naval Medical Service. Journal [London]
 Royal New Zealand Institute of Horticulture. Bulletin [Wellington]
 † Royal New Zealand Institute of Horticulture. Journal [Wellington]
 † Royal Society. Proceedings. Series B. Biological Sciences
 * Royal Society of Edinburgh. Proceedings
 * Royal Society of Edinburgh. Transactions
 † Royal Society of London. Philosophical Transactions. Series B. Biological Sciences
 Royal Society of New South Wales. Journal and Proceedings [Sydney]
 * Royal Society of New Zealand. Transactions
 * Royal Society of South Africa, Cape Town. Transactions
 * Royal Society of South Australia, Adelaide. Transactions and Proceedings
 * Royal Society of Tasmania, Hobart. Papers and Proceedings
 † Royal Society of Tropical Medicine and Hygiene. Transactions [London]
 Royal Society of Victoria. Proceedings [Melbourne]
 * Royal Society of Western Australia. Journal
 Royal Statistical Society. Journal [London]
 † Royal Zoological Society of New South Wales. Proceedings
 † Rubber Research Institute of Malaya. Journal [Kuala Lumpur]
 Russkii Arkhiv Anatomi, Gistologii i Embriologii
 Saikinaku Zasshi
 Saloni. University. Meteorological Institute. Reports, Misc.
 † Salud [San José]
 *† San Diego Society of Natural History. Memoirs
 *† San Diego Society of Natural History. Occasional Papers
 *† San Diego Society of Natural History. Transactions
 San Miguel. Observatorio. Biblioteca Cientifica [Buenos Aires]
 Sankhya: Indian Journal of Statistics
 † Sanshi-gaku Zasshi [See Bulletin of Sericulture and Silk-Industry]
 Santiago de Chile. Observatorio de Salto. Miscellaneous Papers
 Santiago. Ministerio de Agricultura. Boletin [assigned in part]
 Santo Domingo. Universidad. Instituto Botánico. Publicaciones
 São Paulo. Faculdade de Medicina. Annaes
 São Paulo. Secretaria da Agricultura, Industria e Comércio. Boletim da Agricultura
 † São Paulo. Universidade. Faculdade de Filosofia, Ciencias e Letras. Boletins. Zoologia
 † São Paulo. Universidade. Faculdade de Medicina Veterinaria. Revista
 † São Paulo. Universidade. Faculdade de Philosophia, Ciencias e Letras. Boletins. III. Biologia Geral
 Schweizer Archiv für Neurologie und Psychiatrie [Zurich]
 Schweizerische botanische Gesellschaft. Berichte
 Schweizer Naturschutz
 Schweizerische Zeitschrift für das Forstwesen
 Science [Lancaster, Pa.]
 † Science Society of China. Biological Laboratory. Contributions. Botanical Series
 *† Scientific Agriculture [Ottawa]
 † Scientific Monthly [Lancaster, Pa.]
 * Scientific Tree Topics [Stamford]
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 Scottish Forestry Journal
 Scottish Journal of Agriculture [Edinburgh]
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 Seifenseider-Zeitung [Leipzig]
 † Sei-I-Kai Medical Journal (Seikai Zasshi) [Tokyo]
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 † Semana Medica [Buenos Aires]
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 † Shanghai Science Institute. Journal. Section 4
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 † Silva Fennica [Helsingfors]
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 *† Smithsonian Institution. Explorations and Field-Work of the Smithsonian Institution
 *† Smithsonian Institution. Smithsonian Miscellaneous Collections
 Soap [New York]
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 Sociedad Científica del Paraguay. Revista [Asunción] [assigned in part]
 † Sociedad Cubana de Historia Natural. Memorias [Havana]
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 Sociedade Brasileira de Medicina Veterinaria. Boletim [Rio de Janeiro]
 † Sociedade Broteriana. Boletim [Coimbra]
 † Sociedade de Biología de Pernambuco. Annaes
 † Società Internazionale di Microbiologia. Sezione Italiana. Bollettino [Milan]
 Società Italiana di Biologia Sperimentale. Bollettino [Naples]
 † Società Italiana di Scienze Naturali e Museo Civico di Storia Naturale in Milano. Atti
 † Società Toscana di Scienze Naturali Residente in Pisa. Atti. Memorie
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 † Societas Pathologicae Japonicae. Transactiones [Tokyo]
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- Society of Chemical Industry. Chemistry and Industry [London]
- Soil Research
- *† Soil Science [Baltimore]
- *† Soil Science Society of America. Proceedings Sonnbllick-Verein. Jahresbericht [Vienna]
- † South African Forestry Association. Journal [Pretoria]
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- * South African Journal of Science
- South African Medical Journal [Capetown]
- * South African Veterinary Medical Association. Journal
- South Australia. Department of Agriculture. Journal [Adelaide]
- * South Australian Museum. Records
- South Australian Ornithologist
- South Dakota Academy of Sciences. Proceedings [Vermillion]
- *† South Dakota Agricultural Experiment Station. Bulletin [Brookings]
- Southeastern Pecan Growers Association. Proceedings of the Annual Convention
- † Southern Appalachian Botanical Club. Journal. Castanea
- *† Southern California Academy of Sciences. Bulletin
- † Southern Florist and Nurseryman [Fort Worth]
- Southern Lumberman [Nashville]
- Southern Medical Journal [Birmingham, Ala.]
- Southern Surgeon
- Southwestern Sheep and Goat Raiser
- † Sovetskaya Meditsina [Moscow]
- Sovetskoe Subtropiki [Soviet Subtropics]
- Speech Monographs
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- † Stain Technology [Geneva, N. Y.]
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- Stanford University. Dudley Herbarium. Contributions
- Stanford University. Food Research Institute. Wheat Studies
- Station Internationale Géobotanique Méditerranéenne et Alpine. Communications
- † Stockholm. Statens Skogsförsöksanstalt. Flygbild
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- † Stomatologija [Moscow]
- *† Storrs Agricultural Experiment Station. Bulletin
- † Sugar Bulletin [New Orleans]
- Sugar Journal
- † Sugar News [Manila]
- Suomen Kalastuslehti-Helsinki
- Surgery
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- Surgical Clinics of North America [Philadelphia]
- Svensk Botanisk Tidskrift [Stockholm]
- Svensk Kemisk Tidskrift
- Svensk Veterinärartidskrift
- Svenska Betes- och Vallföreningen. Meddelande
- † Svenska Hydrografisk-Biologiska Kommissionens Skrifter
- Svenska Skogvårdsföreningens Tidskrift [Stockholm]
- Svenska Vaxtgeografiska Sällskapet, Upsala (Acta Phytogeographica Suecica)
- † K. Svenska Vetenskapsakademiens. Handlanger [Stockholm]
- † Sveriges Pomologiska Föreningens. Årsskrift
- Sveriges Utsädsföreningen Tidskrift
- Syokubuto Oyobi Dôbutsu [See Botany and Zoology]
- Talence. Observatoire. Bulletin
- Tectona
- † Tenger [Budapest]
- *† Tennessee Academy of Science. Journal [Nashville]
- Tennessee State Dental Association. Journal
- † Texas Game, Fish and Oyster Commission. Quarterly Progress Report. Division of Wildlife Restoration [Austin]
- Texas Medical Journal
- Texas Pecan Growers' Association. Proceedings
- Textile Institute. Journal [Manchester, Eng.]
- Textile Research [Lancaster, Pa.]
- Textile World
- † Thailand Research Society. Journal. Natural History Supplement
- Tharandter forstliches Jahrbuch
- † Tiba-si. Japan. Imperial Zootechnical Experiment Station. Bulletin
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- Tidsskrift for Planteavl [Copenhagen] [assigned in part]
- Tidsskrift for Skogbruk
- Tijdschrift over Plantenziekten
- Tijdschrift voor Diergeneeskunde [Utrecht]
- Timberman [Portland]
- † Tohoku Imperial University. Science Reports. 4th Series
- † Tokyo Binrika Daigaku. Science Reports. Section B
- Tokyo. Central Meteorological Observatory of Japan. Bulletin
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- *† Toronto. Royal Ontario Museum of Zoology. Contributions
- *† Toronto. Royal Ontario Museum of Zoology. Occasional Papers
- *† Toronto. University. Studies. Biological Series. (Publications of the Ontario Fisheries Research Laboratory)
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- * Torreya [New York]
- † Transvaal Museum. Annals [Pretoria]
- Tree-Ring Bulletin [Arizona]
- † Treubia; Recueil de Travaux Zoologiques, Hydrobiologiques et Océanographiques [Buitenzorg]
- Trinidad. Imperial College of Tropical Agriculture. Cacao Research. Annual Report
- † Tropical Agriculture [Trinidad]
- † Tropical Agriculturist [Ceylon]
- † Tropische Natuur [Weltevreden, Java] [assigned in part]
- † Trudy Biologicheskogo Nauchno-Issledovatel'skogo Instituta [Tomskii Gosudarstvennyi Universitet] (Travaux de l'Institut Scientifique de Biologie Université Koubycheff de Tomsk)
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- Tucuman. Estación Experimental Agrícola. Circular
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- Turf Culture [Washington, D. C.]
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- † Turtox News [Chicago]
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- † Union of South Africa. Department of Agriculture and Forestry. Bulletin
- *† Union of South Africa. Department of Agriculture and Forestry. Entomology Memoirs
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- † Union of South Africa. Department of Agriculture. Ondersteepoort Journal of Veterinary Science and Animal Industry [Pretoria]
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† U. S. Department of Agriculture. Bureau of Biological Survey. Bird Banding Notes

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† Vestnik Dal'nevostochnogo Filiala Akademii Nauk SSSR (Bulletin of the Far Eastern Branch of the Academy of Sciences of the USSR) [Vladivostok]

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*† Wisconsin Agricultural Experiment Station. Bulletin [Madison]

† Wisconsin Conservation Bulletin [Madison]

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*† Wyoming Agricultural Experiment Station. Bulletin [Laramie]

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- Zeitschrift für Züchtung, Reihe A. Pflanzenzüchtung
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- *† Zoologica [New York]
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